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# Do bilinguals create two different sets of vocabulary for two domains?

## Vocabulary development and overlap in the first years of schooling

Elke G. Montanari,<sup>1</sup> Roman Abel,<sup>2</sup> Barbara Graßer<sup>1</sup> and Lilia Tschudinovski<sup>1</sup>

<sup>1</sup>Center for Diversity and Education, Institute for German Language and Literature, University of Hildesheim, Germany / <sup>2</sup>Institute for Psychology, University of Kassel, Germany

The central research question is how intensive exposure to the majority language at school affects the development of vocabulary. In a cross-sectional study with a longitudinal subsample follow-up, we investigated the development of vocabulary during the first four years at school, as vocabulary development is considered an important factor regarding bilingual children's success at school. The sample consisted of 126 bilingual Russian/German-speaking children aged 6;0 to 10;11 years in Germany, who were tested for expressive and receptive vocabulary using a picture naming task.

Our results show that while the majority language is acquired at an expected rate, the heritage language's extensive vocabulary does not develop further over the course of primary school attendance. The overlap of the vocabularies increases. Additionally, the number of items that are named exclusively in the majority language increases, whereas the number of items that are named exclusively in the heritage language decreases.

**Keywords:** vocabulary, overlap, primary school, pupils

### 1. Introduction

Grosjean (1989; 2016) explains that, in his Complementarity Principle, bilinguals usually acquire and use their languages for different purposes, in different domains of life, with different social functions, because different aspects of life often

require different languages (Grosjean 2016). This principle impacts the proficiency and fluency of language use because, when a language is spoken in a reduced number of domains and with a limited number of people, it will develop at a lesser rate than a language used in more domains and with more people. Further, the Complementarity Principle has an impact on language dominance, as the language which is used more frequently is very often mastered with more fluency and becomes the dominant language.

When multilingual children start school, which occurs in Germany at the age of 6,<sup>1</sup> in most cases, the majority language is the language of instruction.<sup>2</sup> That is, schools predominantly offer majority language-based input and language use, in terms of both quantity and the complexity of stimuli (see Argyri & Sorace, 2007; Montrul, 2016; Paradis & Nicoladis, 2007; Pearson, Fernández, Lewedeg, & Oller, 1997; Treffers-Daller & Silva-Corvalán, 2015). On the other hand, the heritage language, that is, the minority language connected with the migration biography of the family, is primarily used at home and/or in informal contexts and, to a lesser extent, at school (Montrul, 2016). Heritage language support, with the exception of a few bilingual schools, is limited to a few hours per week and not available for all children.<sup>3</sup> As vocabulary is actively expanded during the pupils' school career (Schmitt, 2000), language use and the distribution of languages in the domains of school and family are expected to have an impact on vocabulary.

## 2. Research

Bilingual children have a weaker command of vocabulary than monolingual peers in the language of the environment (see Ben-Zeev, 1977 for 7-year-olds; Rosenblum & Pinker, 1983 for 5-year-olds; Doyle, Champagne, & Segalowitz, 1978 for preschool children; Umbel, Fernández, & Oller, 1992 for first graders; Bialystok, Luk, Peets, & Yang, 2010). However, when bilinguals are examined in their dominant language, the differences disappear (Hoff, Core, Place, Rumiche, Señor, & Parra, 2012; Pearson, Fernández, & Oller, 1993). Bilinguals are found to have a vocabulary that does not differ from that of monolinguals if sufficient

1. See an overview of the regulations for the school entry date for all the German federal states on: <http://www.bildungserver.de/innovationsportal/bildungplus.html?artid=846>

2. In Germany there are 287 bilingual primary schools for Grade 1 to 4, FMKS 2014, [www.fmks-online.de/\\_wd\\_showdoc.php?pic=1118](http://www.fmks-online.de/_wd_showdoc.php?pic=1118)

3. In Germany, when heritage language support is offered at school or by private associations, it consists of approx.90 minutes per week <https://www.schulministerium.nrw.de/docs/Recht/Schulrecht/Erlasse/Herkunftssprache.pdf>; 1.2, <http://www.schule.de/22410/25,81625.htm>; 8.1.4

input is available, socio-economic status is factored in, and a high level of societal prestige is accorded to both languages (Hoff et al., 2012; Paradis, Nicoladis, Crago, & Genesee, 2011). On the other hand, in many multilingual acquisition contexts the input is not balanced (Allen, Crago, & Pesco, 2006; Meisel, 2011; Schlyter & Håkansson, 1994; Treffers-Daller, Ozsoy, & van Hout, 2007) and this has effects on the balance of proficiency and fluency (Gathercole & Thomas, 2009; Hoff et al., 2012; Unsworth, 2014). Studies with preschoolers show the importance of heritage language exposure and maintenance for vocabulary development (Allman, 2005; Aukrust, 2007; Uchikoshi, 2006).

### *Research questions and assumptions*

In terms of the Complementarity Principle, it is to be expected that the vocabulary in the majority language will develop more quickly than in the heritage language, as the school domain offers particularly rich input and various possibilities for use of the majority language. Therefore, our first hypothesis assumption is that there is a constant and significant growth of vocabulary in the majority language and less growth in the heritage language over the period of the first four years of school attendance.

The second hypothesis is that school and family should be regarded as two domains of language use. Therefore it would be expected to discover two primarily separate sets of vocabulary, that is, in the majority language and in the heritage language, with ongoing schooling and thus only some overlap. In light of these hypotheses, the research questions are:

1. How do the heritage language and majority language sets of vocabulary develop?
2. Do the participants develop two distinct sets of vocabulary, with a small overlap?

## **3. Method**

### **3.1 Participants**

The young participants consisted of  $N = 126$  Russian-German children (63 girls,  $M_{\text{age}} = 8;5$  years, age range: 6;0-10;11 years,  $SD = 1;3$  years);  $N = 113$  children were tested in both languages. All the children had at least one parent or caregiver who spoke Russian as a first language (see Table 1). 62.5% of the children received Russian language support at school and/or in a parent's association. 2.4% of the

participants attended kindergarten; 18.3% first grade; 31.0% second grade; 24.6% third Grade and 23.8% fourth grade.<sup>4</sup> We also tested a subsample of 12 children for a second time between 41 and 46 months after the first German testing.<sup>5</sup>

**Table 1.** Descriptive variables of participants

	Cross sectional sample RU-GER	Longitudinal sample
Participants	<i>N</i> = 126	<i>N</i> = 12
Female	63 (50%)	6 (50%)
Age	6;0–10;11	First testing: 6;2–10;2 Second testing: 9;7–13;11
Mean Age ( <i>SD</i> )	8;5 (1;3)	First testing: 7;8 (1;3) Second testing: 11;4 (1;4)
HL support	62.5%	First testing: 9/12 (67%) Second testing: 8/12 (75%)
Age of Onset GERMAN	81.2% birth 3.4% first year 3.4% 1–3 years 9.4% 3–5 years 2.6% after 5	11/12 birth 1/12 1–3 years

Regarding the parents' level of education, using the ISCED 97-classification system, 37% of the mothers had secondary school qualifications, 17% had higher education entrance certificates, and 46% had university degrees (Schneider, 2008). For the fathers, 38% had secondary school qualifications, 16% had higher education entrance certificates, and 46% had university degrees. 66% of the mothers and 70% of the fathers received their highest qualification in their country of origin. By way of comparison, for the German population, 48.6% of 25–35 year olds have secondary school qualifications and 24.9% a university degree.<sup>6</sup>

In terms of income, 7.5% of the families in the sample earned below €1,000 a month; 19% up to €1,500; 17.5% up to €2,000; 21% up to €2,500; 14% up to €3,000; and 21% more than €3,000 per month. The mean income for a household in Germany with two adults and at least one child is €3,180 per month.<sup>7</sup> In sum-

4. We also refer to kindergarten children as *pupils* in the text.

5. The second testing was part of the iLeb-Project (Montanari, Graßer, Tschudinovski, & Abel 2018).

6. Comparison data DESTATIS, 2015, [https://www.destatis.de/DE/Publikationen/Statistisches-Jahrbuch/Bildung.pdf?\\_\\_blob=publicationFile;3.1.1 & 3.1.2](https://www.destatis.de/DE/Publikationen/Statistisches-Jahrbuch/Bildung.pdf?__blob=publicationFile;3.1.1&3.1.2)

7. <http://www.bpb.de/nachschlagen/datenreport-2016/226220/nettoeinkommen>

mary, the sample has a population with a high level of education, but a relatively low income.

Regarding command of the heritage language, 97% of the mothers and 82% of the fathers stated that their fluency was at an advanced or native speaker level (CEFR level B2 or C1–2). In 76% of the families, both parents spoke Russian at a native speaker level, and in 24% of the families, only one parent spoke Russian at a native speaker level.

Regarding command of the majority language, the parents' self-rating of their proficiency varied to a great extent and the parents' language skills in German only weakly correlate with one another ( $r = .240, p < .05$ ).

**Table 2.** Language proficiency of the parents

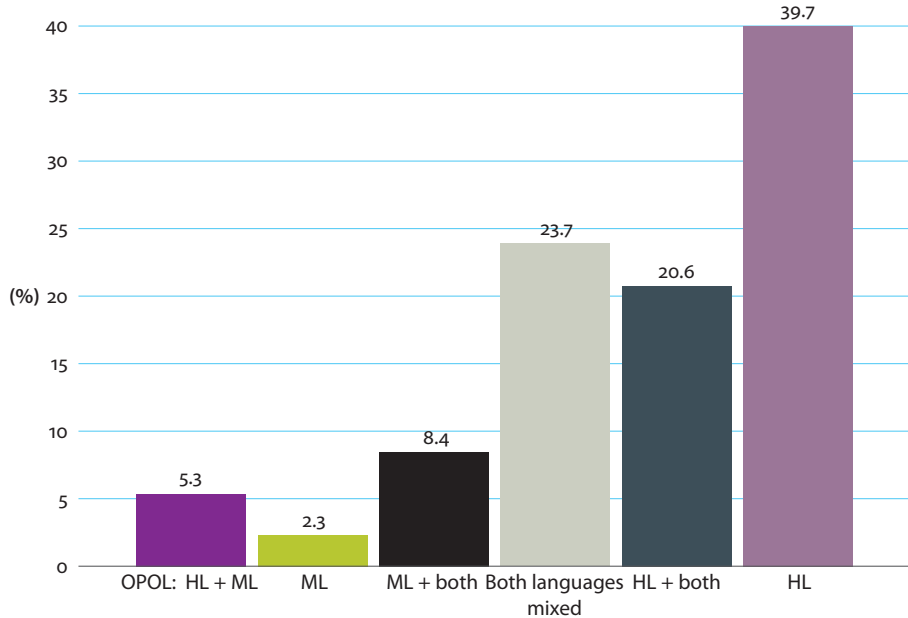
Proficiency in German	No proficiency	Beginner level		Advanced level		Native speaker
		A1	A2	B1	B2	
CEFR level	0	A1	A2	B1	B2	C
Mothers in%	0	5	7	28	38	23
Fathers in%	2	8	6	23	32	28

In 4% of the families, the highest proficiency level of at least one parent in the majority language was at a beginner level (A1–2 in CEFR), in 62% of the families at least one parent ranked their fluency in the majority language at an intermediate level (B1–2) and in 34% of the families at least one speaker was at a native speaker level (C1–2). It can be seen that most of the children's parents had a good mastery of the majority language and, in nearly all cases, at least one of the parents was a native speaker of the heritage language Russian.

By the end of the first grade, children have usually acquired their first literacy skills in the majority language, and know most of the letters of the alphabet, as was the case for our sample. In the second grade, usually all the alphabet is known. In the third and fourth year of schooling, small texts are written and read (see also the official primary school curriculum, Niedersachsen, 2017). Literacy skills in the heritage language are extremely heterogeneous. Russian literacy is taught in heritage language associations and language support classes; therefore, literacy in the heritage language is only partially acquired (Anstatt, 2011).<sup>8</sup> In terms of literacy, 99% of the parental homes have German-language children's books. Russian-language children's books are available in 76% of families. As an indicator of a literacy-related action, participants were asked whether the children had already visited a children's theatre with their families; 71% of the children answered *yes*, 29% *no*.

8. Unfortunately, we did not carry out any specific literacy tests.

Regarding language use at home (see Figure 1), in 84% of the families, both parents spoke Russian at home. Only three of the parents (2.3%) predominantly spoke German with the family.



**Figure 1.** Language use in the family: language use of both parents (HL = Russian, majority language = German)

### 3.2 Tasks

We used a cross-sectional study ( $N = 126$ ) and tested a subsample ( $N = 12$ ) of Russian-German speaking children a second time. Because expressive and receptive vocabulary may differ considerably between the majority language and heritage language (Gibson, Oller, Jamulowicz, & Ethington, 2012), we investigated both. Although English acquisition in combination with other languages at school age has already been the focus of existing research, other language combinations are underrepresented, therefore German and Russian were chosen.

We used a picture naming task, the WWT 6–10 (Glück, 2011), which has been standardized for 880 German monolingual children and a small Turkish-German sample. The test consists of 95 items: 26 nouns, 23 verbs, 23 adjectives, and 23 category nouns (e.g., *Jahreszeiten* ‘seasons’; *Gebäude* ‘buildings’). To test expressive vocabulary, photographs of objects or actions were shown and the children were asked to name what they saw or to name the opposites (e.g., “*Was ist das Gegenteil*

von süß?“ ‘What is the opposite of sweet?’). If the child did not give an appropriate answer, he or she was asked for this in the receptive testing.

To test receptive vocabulary, four photographs were shown and the child was asked to point to the requested item (e.g., “*Zeige auf zeigen!*” ‘Point to pointing.’), a procedure that is known from the Peabody Picture Vocabulary Test PPVT (Dunn & Dunn, 2007). After the testing, all the answers were rated by two native speakers for specificity and appropriateness, using a catalogue of target items. The evaluation of the answers after the test allows for the acceptance of appropriate answers that are not included in the catalogue of expected correct answers.

For the Russian adaption, Russian native speakers translated the items, checked the expected target answers with the pictures, discussed the items for lexical and cultural appropriateness, and finally evaluated the child’s responses to correctness and appropriateness in Russian. The participants were tested by native speakers in random order of the languages. In general, the languages were tested at an interval of one to four weeks. The testing took an average of approximately 50 minutes per language, per child. The testing was stopped when the children did not answer for five successive items (interruption criterion). In order to ensure that the response protocols were designed correctly, the responses were recorded and checked. The tests were conducted at parent’s associations and primary schools in several German cities, with a focus on Lower Saxony. Further, a structured interview was conducted with the children, and the parents completed a bilingual questionnaire, which they answered at home. As far as language proficiency was concerned, the parents were asked for self-assessments using sample formulations from the Common European Framework of Reference Reference: CEFR (*Europarat für interkulturelle Zusammenarbeit*, 2001).

### 3.3 Procedure

For the analysis, two scores for the expressive vocabulary were calculated (Pearson, Fernández, & Oller, 1993). The *Total Vocabulary* score (TV) is the addition of every naming of an item (i.e., one named item in both languages, *zeigen* and *указань* ‘to point’ = 2 points for Total Vocabulary). That is, Total Vocabulary is the sum of the raw values achieved in both languages. The *Total Conceptual Vocabulary* score (TCV) records whether an item or a concept could be named in one or both languages (*zeigen* and/or *указань* = 1 point for Total Conceptual Vocabulary).<sup>9</sup> The number of items named correctly by an individual in both languages, the overlap, is the difference between all the correct answers in the heritage language and the

9. Only children who fully completed the Russian test are included in the calculation of Total Vocabulary and Total Conceptual Vocabulary.



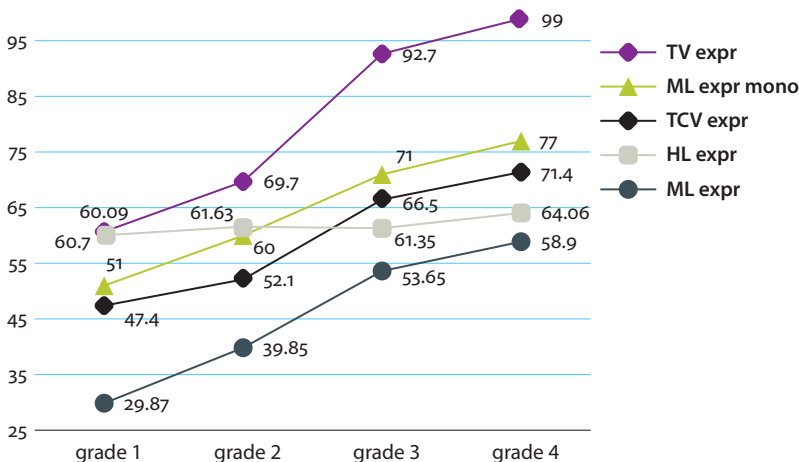
majority language (= Total Vocabulary) and the named concepts (= TCV), thus overlap = Total Vocabulary – Total Conceptual Vocabulary.

We treated the time of attendance at school (in Germany these are, e.g. Grade 1; Grade 2, etc.) as a factor for the development of the vocabulary. We also calculated the *contact time* with German, that is, the biological age minus the age of onset (Tracy & Gawlitzek-Maiwald, 2000).

## 4. Results

### 4.1 Cross-sectional results

With regard to *expressive vocabulary in both languages with Total Vocabulary and Total Conceptual Vocabulary*, the mean value for the Total Vocabulary of the bilinguals was considerably higher than the mean value of the monolingual norming sample (Figure 2).



**Figure 2.** Expressive (expr) vocabulary in mean values: correct answers from a total of 95 test items for bilinguals for Total Vocabulary (TV), Total Conceptual Vocabulary (TCV), heritage language (HL), majority language (ML) and for the monolingual norming sample (ML expr mono).<sup>10</sup>

The number of the named items for the bilingual group (TCV) was only slightly lower than those of the monolingual norming sample (Figure 2): Total Conceptual

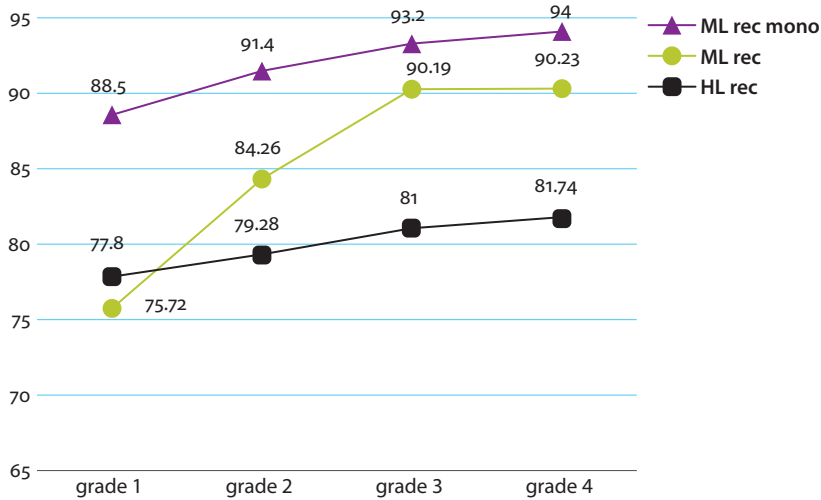
10. The performance in the heritage language includes only those pupils who completed the test in the heritage language; the performance in Total Vocabulary and Total Conceptual Vocabulary of pupils who did not complete the test in the heritage language was equal to the performance in the majority language; only Total Vocabulary values can exceed the threshold of 95.

Vocabulary increased from 47 in the first Grade to a mean value of 71 in the fourth grade.

The ANOVA revealed highly significant results for Total Vocabulary development,  $F(3, 107) = 5.59, p < .001$ ; Total Vocabulary increased most rapidly during the transition from second to third grade,  $t(60) = -2.25, p = .028$ . The subsequent Bonferroni test did not show significant results between grades, but a significant difference between grades 1 and 3,  $p = .043$ . For Total Conceptual Vocabulary, the ANOVA revealed a highly significant development,  $F(3, 107) = 9.32, p < .001$ ; the Bonferroni follow-up showed only a significant difference from Grade 2 and 3,  $p = .017$ .

With respect to the average *expressive performance in the majority language*, there was a rapid development in the productive vocabulary of the majority language with an average increase from 29.87 items to 58.9 items. The ANOVA revealed a highly significant development of the expressive vocabulary in the majority language during primary school,  $F(3, 119) = 25.27, p < .001$ . The Bonferroni follow-up showed a significant difference from Grade 1 to Grade 2 with  $p = .039$ , and from 2 to 3 with  $p < .001$ , but not from Grade 3 to 4, thus  $p = .824$ . Compared to the monolingual standardization sample, the bilinguals' mean expressive testing scores corresponded to an age-normalized percentile rank of 21.21 ( $SD = 24.56$ ). If the contact time with majority language was taken into account instead of the biological age, the mean percentile rank of the bilinguals increased only slightly to 26.46, and the standard deviation was larger (28.18). The bilingual average value of Grade 4 ( $M = 58.9$ ) was close to the mean of the monolingual norming sample in Grade 2 ( $M = 60$ ) (Figure 2).

Concerning the *receptive performance in the majority language* (Figure 3), there was only a moderate difference between the bilingual children's understanding and that of the majority language monolingual norming sample, within one standard deviation. Compared within the monolingual norming sample, the average receptive performance corresponded to an age-normalized percentile rank of 30.6 ( $SD = 30.96$ ). The receptive vocabulary size in the majority language increased during the first four years at school,  $F(3, 119) = 24.61, p < .001$ . The Bonferroni follow-up showed a significant difference from Grade 1 to Grade 2,  $p < .001$ , and from 2 to 3,  $p = .004$ .



**Figure 3.** Receptive (rec) lexical acquisition in the first four years at school in mean values: number of correct answers from a total of 95 test items, bilingual test group in heritage language and majority language and monolingual norming sample.<sup>11</sup>

For the *expressive performance in the heritage language*, the children either showed a low proficiency in Russian, resulting in the test being abandoned by 45% of the participants, or a good mastery. In the first and second grades, the average number of children who completed the whole test in the heritage language was slightly higher than that of the monolingual norming sample (Figure 2). However, this well-developed heritage language vocabulary does not increase; the ANOVA for the comparison between grades revealed no significant result,  $F(3, 57) = 0.35$ ,  $p = .785$ .

For the heritage language, 97.3% of the children were able to successfully complete the *receptive part* of the test. The mean receptive performance of all bilinguals in the heritage language was below that of their monolingual peers in German at all grades and also below their receptive performance in the majority language. The receptive vocabulary size in the heritage language did not increase, and the ANOVA did not deliver a significant result,  $F(3, 97) = 0.46$ ,  $p = .707$  (Figure 3).

The children who were interrupted during the heritage language expressive test scored 72.62 ( $SD = 12.28$ ) on the receptive test; the children who fully completed the expressive test achieved a mean value of 85.87 ( $SD = 7.17$ ) in the receptive test. The difference in the receptive vocabulary size of children who completed

11. The performance in the heritage language includes only those pupils who completed the receptive testing in the heritage language.

the expressive test versus those that did not was highly significant,  $t(101) = 6.81$ ,  $p < .001$ ; the two groups did not differ with regard to their average age.

For each individual child, we calculated the *receptive-expressive-difference* between the result in the expressive test and the result in the receptive test, from which we created the mean value (Figure 4). The results showed a wide gap of approximately 40 items between the means of the expressive and receptive vocabulary in the majority language and a smaller gap in the heritage language (majority language,  $M = 39.76$ ,  $SD = 11.88$ ; heritage language,  $M = 24.50$ ,  $SD = 14.18$ ). The receptive-expressive-difference in the majority language decreased significantly,  $F(3, 119) = 12.41$ ,  $p < .001$ . The Bonferroni follow-up showed a significant difference between grades 2 and 3 with  $p = .014$ . For the heritage language there was no significant change,  $F(3, 51) = .41$ ,  $p = .745$ .

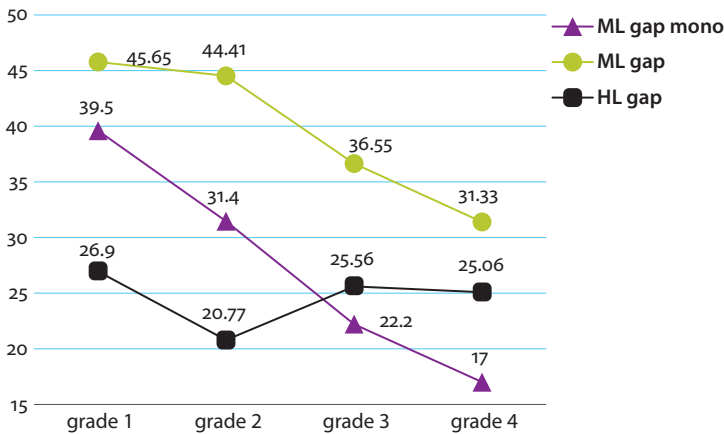


Figure 4. The mean difference between expressive and receptive values

A correlation of the test scores with education and profession showed a significant impact of the profession of the mother on vocabulary development in both languages; Total Vocabulary and Total Conceptual Vocabulary; a high level of education and a high professional level of both parents correlated with the heritage language scores (Table 3).

The proficiency of the parents in the majority language, as expressed in the self-rating, did not correlate with any result of the children, neither Total Vocabulary, Total Conceptual Vocabulary, majority language nor heritage language,  $ps > .1$ . However, there was a correlation for the heritage language. That is, the mothers' Russian language skills related to the children's results in the heritage language,  $r = .346$ ,  $p = .004$ , and consequently to Total Vocabulary and Total Conceptual Vocabulary.

**Table 3.** Spearman correlation between vocabulary and educational and professional level of parents

Participants scores	German expressive	Russian expressive	TV	TCV
Educational level of the mother	-.023	.291**	.246*	.208
Educational level of the father	.011	.315**	.296**	.269*
Profession of the mother (ISEI)	.218*	.329**	.415***	.429***
Profession of the father (ISEI)	-.057	.254*	.223	.246*

Regarding heritage language proficiency, there was a native speaker in each family, so there was a marginal variation in the sample (Table 4).

**Table 4.** Spearman correlation of parents' proficiency in German and participants' scores

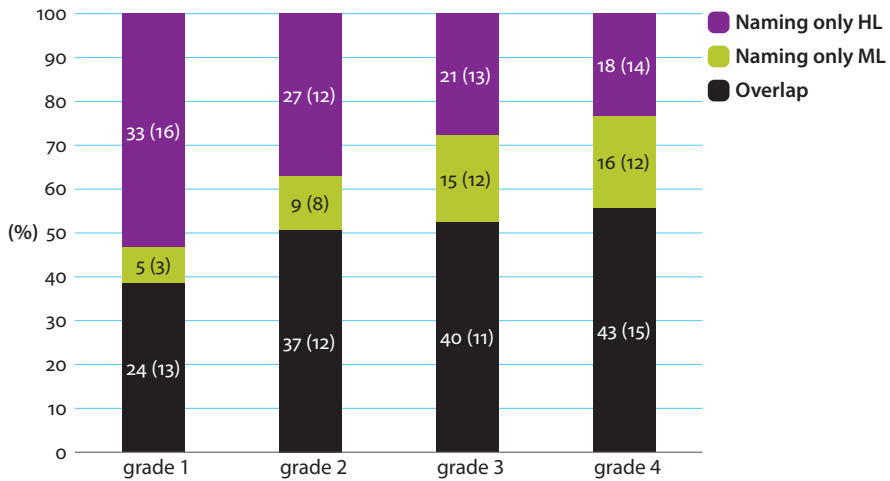
Participants' scores	German expressive	Russian expressive	TV	TCV
Proficiency in German of the mother	-.158	-.008	.065	.083
Proficiency in German of the father	-.052	.094	.058	.059
Proficiency in Russian of the mother	.002	.346**	.306*	.273*
Proficiency in Russian of the father	-.140	.181	.124	.103

In order to identify overlap and items that are only named in one language, we only used the data from the expressive tests. The mean of the *items only named correctly in the heritage language* declined from 33 in Grade 1 to 18 in Grade 4,  $F(3, 57) = 2.96$ ,  $p = .039$  (Figure 5). The Bonferroni follow-up comparison shows significance from Grade 1 to Grade 4,  $p = .048$ .

The average number of *items known only in the majority language* increased from 5 (Grade 1) to 18 (Grade 4),  $F(3, 57) = 3.67$ ,  $p = .017$ . The Bonferroni follow-up comparison showed significance from Grade 1 to Grade 4,  $p = .028$ .

From the Grade 2 onwards we found an increasing *overlap*. The mean overlap in Grade 1, from 24 of 95 items, increased to 43 by Grade 4. The greatest increase was between Grade 1 and Grade 2 where overlap increased significantly,  $F(3, 57) = 4.97$ ,  $p = .004$ . The Bonferroni follow-up comparison showed a significant change from Grade 1 to the Grade 3,  $p = .020$ .

Children who speak exclusively Russian at home had a larger overlap,  $F(1, 103) = 4.88$ ,  $p = .029$ . However, Russian input at home did not influence the development of overlap across the four grades,  $F(3, 103) = 0.72$ ,  $p = .540$ .



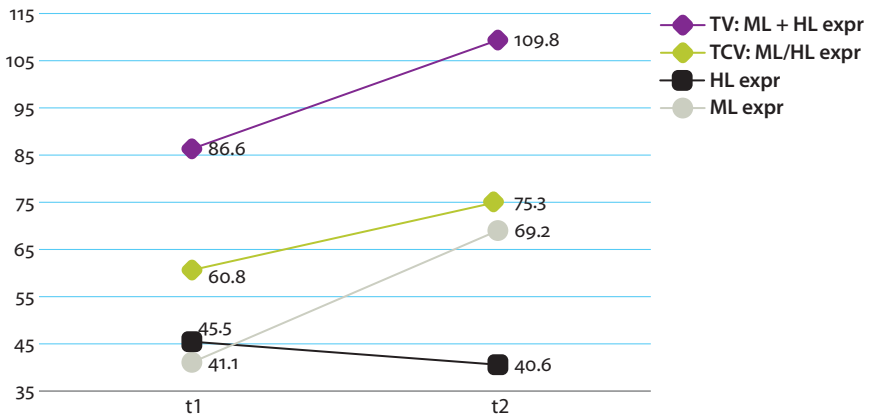
**Figure 5.** Development of the objective (means within the bars, SD in brackets) and relative (in% – displayed as a part of each bar) composition of Total Conceptual Vocabulary: Overlap and items named only in one language, HL = heritage language, ML = majority language.<sup>12</sup>

#### 4.2 The longitudinal subsample

In the longitudinal subsample, a large degree of alignment with the cross-sectional results could be found in the mean values (Montanari et al., 2018). Using the t-test for dependent samples, the longitudinal data confirmed a significant increase for Total Vocabulary,  $t(11) = 3.37$ ,  $p = .006$ , and Total Conceptual Vocabulary,  $t(11) = 3.44$ ,  $p = .006$  (Figure 6).

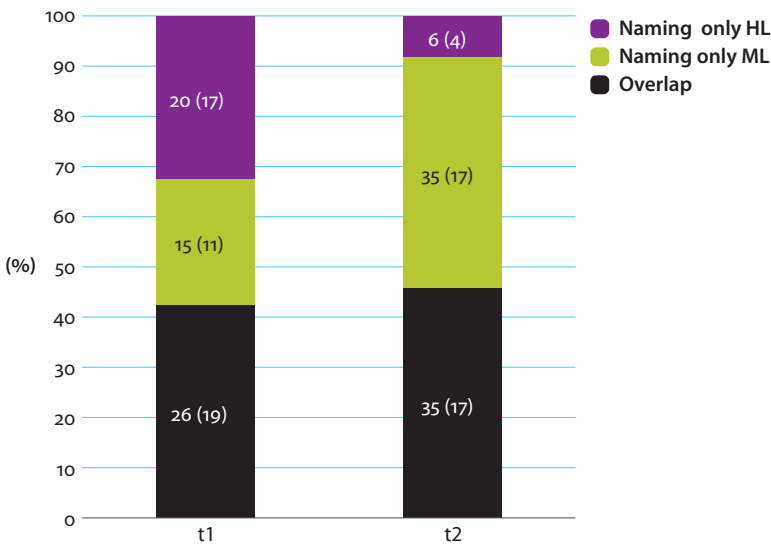
A significant increase in the expressive vocabulary was found in the majority language,  $t(11) = 6.54$ ,  $p < .001$  (Figure 6). The longitudinal data indicated a highly significant development of receptive vocabulary in the majority language in the mean from 82.3 ( $SD = 12.3$ ) at testing 1 (t1) to 93.7 ( $SD = 1.6$ ) at testing 2 (t2),  $t(11) = 3.54$ ,  $p = .005$ . The longitudinal data confirmed no development for heritage language expressive performance,  $t(11) = -1.00$ ,  $p = .335$ , and for heritage language receptive performance, the mean is 84 items at t1 ( $SD = 11.6$ ) and 83.8 ( $SD = 14.6$ ) items at t2. The t-test for dependent samples is, therefore, not significant,  $t(11) = -.133$ ,  $p = .897$ .

12. Dark: Number of items named correctly in both languages (Total Vocabulary – Total Conceptual Vocabulary). White: Items named correctly in the majority language only (TCV – heritage language). Light: Items named correctly in the heritage language only (TCV – majority language). This shows the composition of Total Conceptual Vocabulary only for those participants who fully completed the testing of the heritage language.



**Figure 6.** Longitudinal results in means for Total Vocabulary (TV), Total Conceptual Vocabulary (TCV), heritage language (HL), and majority language (ML)

Items named only in the heritage language decrease significantly,  $t(11) = -3.06$ ,  $p = .011$ , but items named exclusively in the majority language significantly increase,  $t(11) = 5.30$ ,  $p < .001$  over time (Figure 7). The overlap increases and the increase approaches significance,  $t(11) = 1.92$ ,  $p = .081$ .



**Figure 7.** Development of overlap in the longitudinal subsample (mean values within the bars; SD in brackets) and relative (in%) composition of Total Conceptual Vocabulary

## 5. Discussion

With regard to the research question of how vocabulary develops in the majority language and heritage language, we find a constant expansion of the multilingual vocabulary, of the vocabulary in the majority language and stagnation in the heritage language. By the end of elementary school, the expressive vocabulary of the monolingual norming sample is reached with regard to Total Vocabulary and Total Conceptual Vocabulary. The initial hypothesis states that there should be a connection between the use of the majority language in academic domains and the development of majority language vocabulary, according to the Complementarity Principle. As predicted, a strong growth in the majority language is confirmed. Again, according to the Complementarity Principle, the hypothesis is that, because of the use of the heritage language which remains predominantly restricted to family and quotidian contexts, heritage language should show a much slower development. The data strongly support this hypothesis.

The second research question was concerned with whether the two sets of vocabulary are predominantly independent. The criterion for this was the number of items named in one or both languages (overlap). The results show that, contrary to expectations, the overlap increases, that is, no strict vocabulary distinction is made between the domains of *family* and *school*. Our data principally confirm the Complementarity Principle, since we find an influence of language use on vocabulary. Intensive oral and literal language use reinforce the acquisition and learning of vocabulary in the majority language. The Total Vocabulary, as a value for vocabulary in both languages, increases primarily between Grades 2 and 3, and we attribute this finding to literacy education. At the end of Grade 2, reading and writing in the majority language have begun to form a substantial part of class activities, providing new input in the majority language (see curricula, e.g., Niedersachsen, 2017). The heritage language is not used more intensively than before, therefore the heritage language vocabulary does not undergo any expansion, and thus stagnates. These findings are similar to those of Ribot, Hoff, & BurrIDGE (2017) who found a significant influence of language use on vocabulary development in young children. However, despite a large expansion of majority language vocabulary, there remains a constant gap between the expressive command of the monolingual norming sample and the bilinguals during primary school attendance.

The composition of the vocabulary, however, does not confirm our deductions concerning the Complementarity Principle. Although the use of the heritage language is essentially limited to family activities and is only moderately used in the classroom, two largely distinct sets of vocabulary are not developed, but, instead, a mainly overlapping vocabulary is created. We explain this by the fact that, in primary school, numerous questions and teaching contents are linked to the



everyday experiences of the pupils, and therefore an everyday-vocabulary is essentially created (Niedersachsen, 2017). In this context, it might be relevant that in 60% of families, the majority language is also used for the family domain. This suggests that an overlap might already have been created by the families' language use.

## 6. Conclusion

The development of vocabulary towards a more school language (ML-) related vocabulary is an ecological response to the linguistic needs of schoolchildren. That is, while heritage language vocabulary seems to be sufficient to achieve linguistic goals in everyday life, an expansion of the vocabulary in the majority language is necessary and relevant, in order to satisfy constantly expanding and complex needs in the primary school classroom. In other words, we understand the unequal development of vocabulary in the heritage language and majority language as an extremely appropriate adaptation of vocabulary to the language needs of school-aged children.

We found a sizeable, but decreasing, expressive-receptive gap in the majority language and a constant gap in the heritage language. This differs from the findings of Gibson et al. (2012), who found, for preschoolers, a similar gap in the heritage language Spanish (as for Russian these data) but a small gap in the majority language, English. The finding of a substantial expressive-receptive gap and limited expressive vocabulary in our sample has important consequences for education contexts, which rely heavily on oral and active participation of pupils in the discourse of instruction, as is the case in the German education system. Children with a more restricted proficiency in expressive vocabulary have fewer possibilities to engage verbally in classroom interactions and, therefore, could be underrated.

However, further questions need to be asked about the impact of test results on language activities in an educational context. In a perspective oriented on the concept of multi-competence, multi-competence is defined as the knowledge and mastery of several languages as part of a person's individual skills, acquired in interaction and/or educational situations. Representatives of a multi-competent perspective argue that multilingual speakers could apply strategies and approaches in their linguistic actions and output in which they use numerous linguistic means from a multilingual repertoire (Otheguy, García, & Reid, 2015) so that they successfully interact (Cook, 1992; Franceschini, 2011; Jessner, 2017; Li Wei, 2011). Therefore, methods using authentic language samples would be an important future procedure to obtain insights into language use in practice.

To conclude, we want to make three methodological remarks: Firstly, a vocabulary test cannot easily be translated into other languages because concepts

between languages and cultures differ, and because word frequencies, and so forth, are not the same (Clasmeier, Anstatt, Ernst, & Belke, 2016; Gathercole, 2013). For example, regarding the Russian adaption of the items, there was a concrete problem for one item: Russian has a distinction between the word for humans and small animals eating (*есть*), and big animals eating (*жрать*). The German distinction is between humans eating (*essen*) and animals eating (*fressen*). The stimulus is a picture of a small, white cat, and therefore *есть* is the appropriate answer, even though it is not the direct translation of the German word. The solution was to use the post-test rating and to accept the appropriate answers that a monolingual speaker of Russian would accept. The items have only slightly different frequencies in German and Russian (see, e.g., the Leipzig's corpus of vocabulary in German and Russian).<sup>13</sup>

Secondly, the comparison of Total Vocabulary scores with the data of monolinguals helps to take multilingualism into account, but it is not an ideal solution to the problem of comparing monolingual and bilingual sets of vocabulary. Monolingual children can score a maximum of one point for each item, because they are asked only once, and bilinguals can score up to two points per item and, therefore, have an advantage. On the other hand, for the Total Conceptual Vocabulary, only one answer counts even when the child has named an object in *two* languages and has a better performance than monolinguals, and the fact that items may have different meanings in different languages has not been considered (De Houwer, Bornstein, & Putnick, 2014).

Thirdly, when multilingual children are compared with monolinguals, a substantial amount of their linguistic knowledge is ignored, and it is difficult to understand the complexity of their cognitive performance (Pearson, Fernández, & Oller, 1993; Thordardottir, Rothenberg, Rivard, & Naves, 2006). However, at schools and other educational institutions, monolingual and multilingual pupils have to reach the same learning objectives in the medium of instruction, and performances are compared exclusively in this medium. Consequently, the research debate on multilingualism finds itself with an irresolvable contradiction. On the one hand, multilinguals cannot be compared with monolinguals; on the other hand, in education and in society, multilinguals often experience such comparisons.

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13. The Leipzig Vocabulary Corpus is a German newspaper corpus based on material trawled in 2011; Sentences: 26,142,898 · Types: 5,876,655 · Tokens: 425,703,278, [http://corpora.uni-leipzig.de/de?corpusId=deu\\_newscrawl\\_2011](http://corpora.uni-leipzig.de/de?corpusId=deu_newscrawl_2011)

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### Address for correspondence

Elke G. Montanari  
 Institute for German Language and Literature  
 University of Hildesheim  
 Universitätsplatz 1, 31141 Hildesheim  
 Germany

[elke.montanari@uni-hildesheim.de](mailto:elke.montanari@uni-hildesheim.de)

 <https://orcid.org/0000-0003-0581-2449>

### Co-author details

Roman Abel  
 Institute for Psychology  
 University of Kassel  
[r\\_abel@hotmail.com](mailto:r_abel@hotmail.com)

Barbara Graßer  
 Center for Diversity and Education, Institute  
 for German Language and Literature  
 University of Hildesheim

[grasserb@uni-hildesheim.de](mailto:grasserb@uni-hildesheim.de)

Lilia Tschudinovski  
Center for Diversity and Education, Institute  
for German Language and Literature  
University of Hildesheim

[lilia.tschudinovski@uni-hildesheim.de](mailto:lilia.tschudinovski@uni-hildesheim.de)

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