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## ***Primary school students' German and English competences in a bilingual programme before and after the COVID-19 pandemic***

This study examines the impact of the COVID-19 pandemic on language development within a bilingual programme with 50% instruction in the foreign language, English. It compares German and English test scores obtained by 184 students before, to those obtained by 71 students after the pandemic, controlling for cognitive ability and maternal education. English proficiency was measured in reading, writing, receptive vocabulary and receptive grammar. German proficiency was assessed through standardized tests for reading and spelling. While results indicated no significant differences in English reading, vocabulary, or grammar between pre- and post-pandemic groups, post-pandemic students performed worse in English writing. In German, the post-pandemic group scored significantly lower in reading, but not in spelling. Importantly, students' language background did not influence the results. The bilingual programme demonstrated resilience in maintaining English proficiency, though challenges remained



with preserving German reading skills. Possible reasons for these findings are discussed in the light of previous research.

**Keywords:** CLIL, COVID-19, primary school, German, English, reading, writing, vocabulary, grammar, minority language

**Słowa kluczowe:** Zintegrowane kształcenie przedmiotowo-językowe (Content and Language Integrated Learning), pandemia COVID-19, szkoła podstawowa, niemiecki, angielski, czytanie, pisanie, słownictwo, gramatyka, język mniejszościowy

## 1. Introduction

During the COVID-19 pandemic (2020-2022), schools in Germany remained closed for extended periods, resulting in a temporary discontinuation of traditional in-person teaching. This period was mainly characterized by a combination of distance learning, blended learning and in-class teaching for groups of varying sizes, depending on the incidence rate (e.g., Fickermann, Edelstein, 2021; Friesch, in prep.; Schult, et al., 2022). This was also the case for primary schools with bilingual programmes.

Many studies have reported a decline in reading and writing skills in school language German after the pandemic, but there are only a few studies comparing foreign language (FL) learning before and after the pandemic, and none relate to the bilingual school context. The aim of this study is, therefore, to examine primary school students' performance in German and English tests before and after the pandemic.

## 2. Theoretical background

### 2.1 Primary school programmes in Germany

In Germany, bilingual programmes are offered by more than 2% of all primary schools (FMKS, 2014). Some of these schools follow an intensive bilingual approach based on immersion principles, which means that 50% or more of the teaching time is conducted in the foreign language (FL). Different subjects (e.g. science, math or music) are taught exclusively in a FL (mostly English or French) in each of the primary school grades (Years 1–4 in most federal states in Germany). The effectiveness of bilingual programmes for monolingual and multilingual students has been demonstrated in a very large number of studies (for reviews, see, e.g., Steinlen, Piske, 2022; Steinlen, 2021).

## **2.2 German competences before and after the pandemic**

Large-scale studies (e.g., PIRLS: Ludewig, et al., 2022; IBQ-Bildungsbericht 2021: Stanat, et al., 2022; Depping, et al., 2021 for Years 3-5; Schult, et al., 2022 for Year 5) have indicated a decline in German reading and writing skills among young students following the pandemic. Multilingual students (often with a migration background) also showed significantly lower performance in German tests compared to their monolingual peers. Similar findings have been reported internationally for reading and writing skills in Years 4 and 9 (e.g., PIRLS, 2021: Mullis, et al., 2022; PISA, 2022: OECD, 2023; De Witte, François, 2023), which have identified several factors contributing to the decline in literacy skills in the school language. For example, during the pandemic, students experienced reduced learning time, lower motivation, fewer peer interactions, and less direct instruction and feedback from teachers. Many children faced internet access issues and insufficient parental support.

The interpretations relating to multilingual students' poorer performance in the school language did not change after the pandemic and include references to mismatches between home and school languages, and lower parental educational background, socio-economic status, and cultural capital compared to monolingual peers.

## **2.3 English competences before and after the pandemic**

Numerous studies on FL learning during the pandemic relate to good teaching practices in the context of distant and blended teaching (for Germany, e.g., Gitschthaler, et al., 2022; Lay, Gibley, 2020; Rogge, 2022; Weltgen, et al., 2022; and for the international context, e.g., Chung, Choi, 2021; Ghanbari, Nowroozi, 2021; Hartshorn, McMurphy, 2020; Kałdonek-Crnjaković, 2022; Klimova, 2021; Krajka, 2021; Psinos, 2021; van der Velde, et al., 2021; Werker, Royal Society of Canada, 2021; Wright, 2021).

However, only two studies in Germany have compared FL learning before and after the pandemic. Hopp and Thoma (2020) examined 269 students in Year 4 before and after fifteen weeks of school closure in 2020, assessing receptive vocabulary and receptive grammar in regular English classes. The two groups (pre/post school closure) did not show any significant differences in FL development, and they retained and even marginally improved their FL skills when very little or no EFL instruction was available. As possible reasons, Hopp and Thoma (2020) suggested possible parental or other non-institutional tuition in English during school closures.

Stanat and colleagues (2023) compared English reading and listening skills of 31,159 Year 9 students in 2022 with those from 2009 and 2015. They found improvements in these skills from 2009/2015 to 2022, regardless of students' language background. The authors attributed these gains to increased school-related activities and greater extracurricular use of English, facilitated by more English-language internet resources. For multi-lingual students, as noted in previous studies, regular use of an additional language at home may have positively impacted their English competencies.

### **3. Research methodology**

#### **3.1 Research questions**

Because the effects of the COVID-19 pandemic on the school language (and particularly on FL competences) have not yet been examined for bilingual programmes in primary schools, this paper will address the following research questions:

1. Were German and English competences in an intensive bilingual primary school programme affected by the pandemic?
2. Were there effects of students' language backgrounds?

#### **3.2 The school context**

Data were collected at a primary school in southern Germany that offers both a regular and a bilingual programme. The bilingual programme, which is the focus of this study, involves teaching all subjects in English except for German, religious education, and mathematics, with 50% of teaching time in English. Teachers only use English in class, although technical terms are introduced in both English and German. The programme follows the curriculum of Baden-Württemberg (Ministerium Baden-Württemberg, 2004, 2016), requiring students to achieve level A1 (Council of Europe, 2018) in English after the end of primary school in Year 4. Although the school does not formally test for placement in the bilingual or regular programmes, preselection effects may occur as parents typically enrol children in the bilingual programme if they believe that they will succeed (e.g., Steinlen, 2021).

### **3.3 The time before and after the pandemic**

During the pandemic, the school closed for eight weeks in 2020, followed by a mix of temporary closures and face-to-face instruction for small groups (2020/21), then longer periods of in-person teaching for all students, with interruptions in 2021/22. During the closures, teaching was conducted online. Later, teachers prepared both online and offline lessons, as some students were at school, while others were at home. The focus was on German and maths, and it is unclear whether 50% of the curriculum was indeed still taught in L2 English. However, for subjects such as science, teachers aimed to cover as much of the curriculum as possible, using English video clips and home experiments with photos and worksheets. Unlike in-class lessons, there were no content tests for bilingual subjects such as science, music, art, and PE during online sessions and alternate teaching periods (pers. comm.).

### **3.4 Research paradigm**

The children in this study participated in a broader longitudinal project investigating (foreign) language learning in regular and bilingual primary school programmes (e.g., Steinlen, 2021). Notably, the primary focus of this project was not on the effects of the pandemic on learning. Data were collected annually from 2012 to 2019 and from 2022 to 2024, encompassing 11 cohorts (8 pre-pandemic and 3 post-pandemic), involving qualitative and quantitative methods (i.e., questionnaires and (standardized) language and cognitive tests).

In this empirical study, the research focus is on the effects of the COVID-19 pandemic on 255 monolingual and multilingual 4th Year students' German and English reading and writing skills, who attended a bilingual primary school programme in Germany. Pre- and post-pandemic test scores have been used to identify differences and infer potential impacts of the pandemic, while controlling for contextual factors such as cognitive ability and maternal education.

### **3.5 Procedure**

Testing was conducted on different days by the authors and trained research assistants in students' classrooms to ensure consistent procedures and comprehension of tasks, with all instructions given in German. Students

were not prepared for the tests and were informed that results would remain confidential. Parental informed consent was obtained, and student participation was voluntary. The project received approval from the Ethical Review Board of the FAU Erlangen-Nürnberg in 2021.

### **3.6 Participants**

The sample included 255 students with a mean age of 10 years and 2 months (SD: 6.7 months), 57% of whom had a multilingual background. Among them, 184 were tested before COVID-19 (56% multilingual), and 71 were assessed afterward (62% multilingual). Parental questionnaires revealed seventeen family languages (e.g., Albanian, Arabic, French, Greek, Korean, Persian, Russian, Spanish, Tamil, Turkish), each spoken by a few children, who acquired German as their L2. Participation in all tests varied due to illness or school activities. All tests were conducted as group tests.

### **3.7 Test instruments**

#### **3.7.1. Control variables**

To control for cognitive abilities in Year 4, the *Standard Progressive Matrices* (SPM; Raven, 1976) were used as a non-verbal intelligence measure, avoiding the need for German language skills, which may have negatively affected L2 German students. The test involved completing geometric patterns within 20 minutes, with 48 items grouped into four sets of increasing difficulty.

In a questionnaire, parents provided details about their child's age, country of birth, and home language(s), and rated their own educational background from "1" (no school certificate) to "6" (university entrance certificate). This rating served as a proxy for the students' social background (Zaunbauer, et al., 2012). Out of 255 parents, 184 responded, yielding a 72.2% response rate, which is generally acceptable (Draugalis, et al., 2008). Non-responses were mostly due to survey skepticism or time constraints. Maternal educational background data was more comprehensive than paternal data, so the following data pertains to maternal education.

#### **3.7.2. The language tests**

German reading comprehension was assessed using *Ein Lesetest für Erst- bis Sechstklässler* (ELFE, Lenard, Schneider, 2006), which evaluates reading at

the word, sentence, and text levels. Students matched pictures with words, selected sentence options, and identified correct answers for text comprehension within 16 minutes. Internal consistency reliability was high (.92-.97), with moderate to strong correlations to other reading tests and teacher evaluations (.45-.71). The maximum score was 120 points, with a normative value of 88 points for Year 4 students.

The *Hamburger Schreibprobe* (HSP; May, 2010) is a German spelling test for Year 4 students, consisting of 16 individual words and five sentences. Internal consistency reliability estimates range from .93 to .98, with high correlations observed compared to other reading and writing test formats and teacher evaluations (.72-.85). A maximum of 42 points can be obtained, with norm values ranging between 30 and 33 points.

The *Primary School Assessment Kit* (PSAK; Little, Simpson, Catibusic, 2003) was initially developed to assess English language skills in immigrant children in Ireland, covering writing, reading, speaking, and listening. This study used only the reading and writing subtests, aligned with CEFR levels A1 (Breakthrough), A2 (Waystage), and B1 (Threshold). Its colourful design was motivating for many students. The reading test (PSAK-R) assesses comprehension at word, sentence, and text levels, using tasks like word-picture matching and multiple-choice questions, and the maximal score was 45 points. The writing test (PSAK-W) involves picture prompts, gap-filling, and short compositions, scoring up to 39 points. Both tests were completed in 45 minutes. Previous studies (e.g., Steinlen, 2021) showed good reliability for Year 4: PSAK-R had a split-half reliability of .85 and .80 and moderate correlations (.56-.57) with other tests; PSAK-W had values of .68 and .42.

The receptive English vocabulary and grammar tests were adapted for group administration. Both are picture-matching tasks conducted in paper-and-pencil format. Using sets 2-5 of the *British Picture Vocabulary Scale II* (BPVS; Dunn et al., 1997), students matched 48 English words to corresponding pictures. The *Test for the Reception of Grammar* (TROG, Bishop, 2003) assessed the comprehension of 20 syntactic constructs - such as word order, singular and plural inflection, and object and subject relative clauses - using 80 image-based prompts.

### 3.8. Data analysis

Descriptive and non-parametric statistics were computed using the Statistical Package for the Social Sciences (IBM SPSS, version 29, 2022) to examine group differences on the basis of data obtained from the two German tests, the cognitive test, the four English tests, and maternal education. The analy-

ses used a 2 (German background: L1 vs. L2) x 2 (pre/post-COVID-19) design, with Bonferroni-corrected post-hoc comparisons. The magnitude of significant differences was assessed using eta-squared, with thresholds for small ( $\leq .05$ ), medium ( $.06-.13$ ), and large ( $\geq .14$ ) effects (Cohen, 1988), with the significance level set at 95% ( $p < .05$ ).

#### 4. Results

Table 1 presents the results for the control variables, showing significant group differences with medium effect sizes. The L1 (monolingual German) groups, both pre- and post-COVID-19, achieved age-appropriate scores on the SPM, while the L2 (multilingual) groups scored slightly below age norms. Parent questionnaires revealed that the programme mainly attracted parents with higher educational backgrounds, typically holding university entrance certificates, except for the L2-Pre-COVID group, where mothers generally held certificates for universities of applied sciences.

**Table 1. Comparing monolingual German (L1) and multilingual (L2) students pre- and post-COVID-19 (own data). Mean values, standard deviations [SD], sample sizes (N), maximum points, norm values, ANOVA group comparisons (\*  $p < .05$ ), and effect sizes ( $\eta^2$ ) for nonverbal intelligence (SPM), maternal education (Educ.), German reading (ELFE), German spelling (HSP), English vocabulary (BPVS), English grammar (TROG), English reading (PSAK-R) and English writing (PSAK-W).**

Test/ (Max. points)	Norm values	L1 Pre- COVID M [SD] (N)	L2 Pre-COVID M [SD] (N)	L1 Post-CO- VID M [SD] (N)	L2 Post-CO- VID M [SD] (N)	Group com- parisons	$\eta^2$
SPM (48)	41-43	41.0 [6.5] (N = 67)	37.2 [6.8] (N = 83)	40.4 [68.8] (N = 24)	37.0 [7.9] (N = 42)	F(3, 212) = 4.734, p = .003*	.13
Educ. (6)		5.5 [1.3] (N = 73)	5.0 [1.3] (N = 78)	5.8 [0.6] (N = 15)	5.6 [0.9] (N = 16)	F(3, 178) = 3.027, p = .031	.11
ELFE (120)	88	96.8 [15.9] (N = 68)	89.4 [22.2] (N = 80)	83.7 [20.8] (N = 19)	82.6 [17.4] (N = 25)	F(3, 188) = 4.559, p = .004*	.14
HSP (42)	30-33	32.7 [6.7] (N = 77)	31.4 [8.3] (N = 93)	33.1 [5.1] (N = 29)	28.4 [10.1] (N = 38)	F(3, 203) = 2.904, p = .056	.09
BPVS (48)		35.1 [4.8] (N = 76)	34.7 [6.6] (N = 93)	34.2 [7.0] (N = 22)	35.4 [7.9] (N = 40)	F(3, 227) = 0.204, p = .894	.14



Table 1 – cont.

Test/ (Max. points)	Norm values	L1 Pre- COVID M [SD] (N)	L2 Pre-COVID M [SD] (N)	L1 Post-CO- VID M [SD] (N)	L2 Post-CO- VID M [SD] (N)	Group com- parisons	$\eta^2$
TROG (80)		50.0 [13.8] (N = 27)	47.9 [18.6] (N = 33)	52.2 [8.6] (N = 26)	50.8 [12.5] (N = 39)	F(3, 121) = 1.469, p = .782	.36
PSAK-R (45)		39.0 [4.0] (N = 66)	38.4 [6.0] (N = 79)	36.8 [6.0] (N = 23)	36.9 [8.3] (N = 42)	F(3, 206) = 1.456, p = .373	.05
PSAK-W (39)		26.6 [5.7] (N = 65)	26.3 [5.3] (N = 79)	19.3 [2.8] (N = 6)	19.4 [2.8] (N = 13)	F(3, 159) = 8.895, p = .001*	.06

Note that maternal education was rated on a scale ranging from „1” (no school certificate) to „6” (university entrance certificate).

Due to significant group differences regarding children's cognitive and social background, univariate analyses of variance were conducted for the German and English tests, using maternal educational background and children's cognitive ability as covariates.

#### 4.1. Effects of the pandemic on German and English tests

The results of the German reading test (ELFE) revealed significant group differences. Pre-pandemic, students performed at age-appropriate levels, while post-pandemic, they exhibited a learning gap equivalent to half a school year relative to normative values. In contrast, the German spelling test (HSP) showed no significant group differences, with students maintaining age-appropriate performance both before and after the pandemic.

For the English tests, the findings were mixed. No significant effects of the pandemic were observed in English reading (PSAK-R, level A2), receptive grammar (TROG), or receptive vocabulary (BPVS). However, English writing scores declined significantly post-pandemic, with a medium effect size, and performance in writing dropped from level A2 to A1.

#### 4.2. Effects of language background on German and English tests

The results for the four reading and writing tests were consistent. Post-hoc analyses did not reveal any significant effects of language background on either the German or the English tests ( $p > .05$  for all).

## 5. Discussion

The purpose of this study was to investigate the effects of the COVID-19 pandemic on German and English skills in a bilingual primary school programme in Year 4, with a focus on students' language background. A total of 255 monolingual and multilingual German students completed a cognitive test and two German tests in reading and writing, along with four English tests in reading, writing, receptive grammar, and vocabulary.

### 5.1. Effects of the pandemic on German and English reading and writing tests

The study showed that the pandemic negatively affected students' German reading skills in the bilingual programme, resulting in a learning delay of half a year. This finding aligns with other research on regular primary school programmes, indicating adverse effects on reading in the school language due to the pandemic (e.g., Depping, et al., 2021; Ludewig, et al., 2022; Stanat, et al., 2022; but see Schult, et al., 2022).

In contrast, the pandemic did not affect students' German spelling skills, which remained age-appropriate before and after the pandemic. This contrasts with Henschel et al. (2022), who reported lower spelling scores post-pandemic, particularly among multilingual students, who experienced a half-year delay. The discrepancy may be attributed to sample differences, such as higher socioeconomic status (SES) and cultural capital in our study compared to Henschel et al. (2022). Additionally, teachers in our study may have emphasized spelling more during the pandemic, and/or spelling in German (with a relatively transparent writing system) could be less cognitively demanding than reading comprehension at sentence and text level (following, for example, Cognitive Load Theory, e.g., Sweller, 1994), leading to less impact from remote education.

This study found inconsistent effects of the pandemic on English test scores. While there were no significant differences between pre- and post-pandemic groups for English reading, receptive grammar, and vocabulary, the post-pandemic groups scored significantly lower in the English writing test. Similar non-significant effects of the pandemic on English competences have been reported by Hopp and Thoma (2020) for receptive grammar and vocabulary in Year 4 and by Henschel et al. (2023) for English reading in Year 9 in regular EFL programmes. Several factors may explain these findings: Increased use of digital media (often in English) may have prevented declines in reading (Henschel, et al., 2023) and receptive vocabulary. Additionally, as

Hopp and Thoma (2020) have suggested, students may have received more parental or non-institutional English instruction during school closures, particularly in vocabulary learning and reading, which could be more prevalent among students with higher SES like those in this bilingual programme.

Regarding proficiency, students in the bilingual programme remained at level A2 for English reading and correctly answered 73% of the vocabulary and 63% of the grammar items. Similar results have been reported in previous studies with slightly different samples (Steinlen, 2017, 2018, 2021). Notably, the reading results exceed the expectations of the Ministry of Education in Baden-Württemberg, which sets A1 as the target English proficiency level at the end of primary school (Ministerium Baden-Württemberg, 2004, 2016).

The effects of the pandemic on FL writing has not been explored in previous research. This study found that the pandemic negatively affected English writing, with students achieving level A1.2 instead of A2.1. However, since this still exceeds level A1, it was considered satisfactory by the school's teachers, especially given that English writing was not the focus in bilingual lessons during the pandemic (pers. comm.).

## **5.2. Effects of language background on German and English tests**

Multilingual and monolingual students performed similarly in both German tests, which is consistent with previous research on bilingual programmes before the pandemic (e.g., Steinlen, Piske, 2022; Steinlen, 2021), but differs from the results of large-scale studies conducted in regular primary schools (e.g., Henschel, et al. 2022; McElvany, et al., 2023; Stanat, et al., 2022). This trend appears to extend into the post-pandemic period and may be attributed to preselection effects, relating, for example, to multilingual students' parents with a relatively high SES who may have been more inclined to support their children to complete assignments at home than multilingual parents in other schools.

The most important finding regarding English competences before and after the pandemic relates to language background: multilingual students performed equally well as their monolingual peers in all English tests, both before and after the pandemic. This result is consistent with other studies on regular and bilingual programmes in primary schools (Steinlen, 2021; Steinlen, Piske, 2022), and it is noteworthy given the challenges posed by the pandemic. Although English is often a third language for multilingual students, this did not pose a significant issue, possibly due to preselection effects, such as the multilingual students' high SES. This advantageous

background may have provided them with better access to digital media, a quiet study environment, parental support, and extracurricular learning opportunities during the periods of school closures and fluctuating instruction (Schneider, et al., 2022).

Other, more general factors likely played a role regarding the insignificant effects of language background, including the typological proximity between German and English, multilingual students' proficiency in German, and heightened metalinguistic awareness due to the acquisition of German as the L2. Moreover, the quality of teaching was high in the bilingual programme, and multilingual students may have particularly benefited from effective teaching strategies such as contextualization, scaffolding techniques, and negotiation of meaning (e.g., paraphrasing, clarification requests). These approaches likely facilitated the acquisition of English and subject content for all students, regardless of their linguistic background (Steinlen, 2021; Steinlen, Piske, 2022), even during the pandemic.

## **6. Limitations and future studies**

This study has several limitations: First, it is based on a small sample size, particularly for the three cohorts tested after the pandemic. Second, many positive results may be due to preselection effects, which have repeatedly been reported for bilingual programmes (see Steinlen, 2021). Third, while Schult et al. (2022) suggested that the negative effects of COVID-19 decrease over time, an informal inspection of our annual German reading test scores did not yet show this trend. Nevertheless, future longitudinal studies should explore changes in intra-individual learning gains, particularly in post-pandemic times. Fourth, there still is limited data on possible effects of COVID-19 on English speaking abilities and subject-specific knowledge in areas such as science, PE, art, and music (cf. Weltgen, et al., 2022). Finally, this paper is not a controlled study on language development *per se*; instead, it documents early German and English development during a period of disrupted and varied instruction in a bilingual programme.

## **7. Conclusions**

This study showed that the impact of the COVID-19 pandemic on competencies in German and English within a bilingual programme was domain-specific, affecting only certain language skills. This positive outcome, which partially deviates from findings in other studies on school language skills, can largely

be attributed to the adaptability and creativity of the teachers. Although it is hoped that school closures will be avoided in the future, hybrid teaching and blended learning have nowadays become integral to young language learners' education (Council of Europe, 2023). Nonetheless, these methodologies and their effects on language competencies require careful monitoring. Therefore, it is essential that pre-service and in-service teacher education include adequate training in remote and socially distanced teaching.

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