In Search of the Benefits of Learning Latin

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The authors studied whether Latin or French as a foreign curricular language is a better preparation for learning Spanish. Fifty native German speakers who took a university Spanish course concluded their course with a translation test. English was the 1st foreign language for all students, whereas half of them had learned French and the other half had learned Latin as their 2nd foreign language at school. Participants who had learned French at school made markedly fewer grammar errors and slightly fewer vocabulary errors in the Spanish test than participants who had learned Latin. Knowledge of Latin is probably not an optimal preparation for modern language learning.

For many centuries, Latin was the language of the church and the sciences in the Western European world. Its value as a foreign language in higher education was therefore rarely questioned. Although Latin had lost its significance as a means of international communication as early as the 17th century, it enjoyed its heyday in Western curricula in the 19th century (Pfeiffer, 1976). In the wake of industrialization, however, there was increasing pressure for the curricula to make room for mathematics, sciences, and modern languages. Nevertheless, Latin persists as a curricular option in secondary schools in many European countries, particularly those with a tracked secondary system, such as Germany. At the Gymnasium, which is the highest track of the German secondary school system, Latin has the status of a core subject on equal basis with mathematics, English, and German. Depending on their elementary school achievement, approximately 35% of students enter the Gymnasium after Grade 4 and graduate after Grade 13. A final examination at Gymnasium level (Abitur) is required for university admission. For the Abitur, a minimum exposure of 4 years to at least two foreign languages is required. The vast majority of German students start with English as their first foreign language and, depending on what their parents decide, study either French or Latin as their second foreign language from Grade 7 on. Depending on which subjects students select in the last 3 years of the Gymnasium, they study the second language until Grades 10, 11, or 13. Overall, about two thirds of the students choose French, and one third choose Latin as their second foreign language.

Advocates of Latin as a school subject make three arguments (Wolff, 1975). First, Latin provides insights into the roots of Western culture. Second, broad transfer effects are assumed, because learning Latin is thought to support the development of intelligent learning and reasoning strategies. It is assumed that studying Latin will improve achievement in formal domains such as mathematics and the sciences. Third, transfer effects to language competencies are expected. Translating Latin sentences into the mother tongue requires grammar knowledge that can be helpful for language-based activities in the mother tongue as well as for foreign language acquisition. Moreover, because Latin is the origin of the Romance languages and has impacted other European languages, Latin might provide advantages for modern language learning.

Studies on the Impact of Learning Latin

The hypothesis that learning Latin is associated with broad transfer effects was seriously challenged as early as the beginning of the past century. E. L. Thorndike (1923) did not find any differences in the science and mathematics achievement of higher education students who learned Latin at school and those who did not. In the Nuremberg longitudinal study on learning Latin, Haag and Stern (2000) intended to find out whether these findings could be confirmed in Germany about 70 years later. Participants were 208 students from 10 Gymnasien in the center and suburbs of Nuremberg, a large city in the German federal state of Bavaria. In this particular state, about one third of the students start with Latin rather than English as their first foreign language. To control for possible selection effects in foreign language choice, data on intelligence, school grades, and interests were collected at the first measurement point at the very beginning of Grade 5, that is, before the participants started to learn their first foreign language. No differences were found in either verbal and nonverbal IQ or grades in German and mathematics between the 115 students who started with Latin as their first foreign language in Grade 5 and the 93 students whose first foreign language was English. In the first follow-up study conducted at the end of Grade 6, that is, after 2 years of foreign language learning, no differences in the IQ and mathematics achievement of the English and Latin learners were

found. In Grade 7, the 115 students with Latin as their first foreign language also began studying English. Of the 93 students who had started with English as their first foreign language, 67 chose Latin and 26 chose French as their second language. The second follow-up study was conducted 2 years later when the students were at the end of Grade 8. At this measurement point, the focus was on deductive and inductive reasoning tasks, text comprehension, and grammar-related activities in German. No significant differences (all $ps > .20$) in deductive and inductive reasoning or text comprehension were found among students with 4 years of Latin, 2 years of Latin, and no Latin at all. There were, however, some between-groups differences in the grammar-related activities, which will be discussed in more detail in the following section.

From the perspective of cognitive psychology, the absence of broad transfer effects of learning Latin (i.e., on reasoning) is not surprising. There is overwhelming evidence for the importance of content-specific knowledge in learning, problem solving, and reasoning as well as for the fact that prior content knowledge is activated primarily by the context in which the information is presented (Detterman, 1993). E. L. Thorndike and Woodworth (1901) have laid the foundations for explaining the conditions under which transfer occurs or fails to occur. According to their theory of common elements, transfer occurs if the source demand and the target demand require the same knowledge elements. As there is hardly any shared knowledge in domains such as mathematics and Latin, no transfer effects are expected by modern cognitive scientists.

However, the theory of common elements suggests that transfer effects from learning Latin to learning other languages, particularly the Romance ones, are highly probable. The Romance languages are descended from Latin, providing the foundation for a wide range of vocabulary in these languages. Because Indo-European languages such as English and German also have many words with Latin roots, learning Latin also may have positive transfer effects on vocabulary proficiency in these languages. Masciantonio (1977) conducted several studies in the United States with several thousand students, most of them in Grades 4 to 6. The students were given 20 min of daily Latin instruction for 1 year and were then compared with a control group with no knowledge of Latin. They were administered intelligence tests as well as tests assessing their native English language proficiency. The largest gains occurred in the vocabulary tests and in tests of other English language skills. More recently, Holmes and Keffer (1995) conducted a short training program (8 hr over 6 weeks) in which university students were taught to identify Latin and Greek roots in English words. In a subsequent English vocabulary test, gains of almost half a standard deviation were observed. Unfortunately during the period in which the experimental group was given lessons in Latin, the control group was given no foreign language instruction at all (Cunningham & Graham, 2000). Therefore, it is still an open question whether Latin has particularly strong transfer potential or whether modern languages such as German or French would have produced similar transfer effects. Moreover, there is a question of whether there is any transfer potential of learning Latin beyond the common roots of certain words.

Common Cognitive Activities as the Source of Transfer

Once psychologists accepted that cognitive competence is guided by an elaborated knowledge base rather than by formal rigor, they were able to explain the absence as well as the occurrence of transfer. Greeno, Smith, and Moore (1993) gave a more concrete form to E. L. Thorndike and Woodworth's (1901) concept of common elements by emphasizing the role of symbol-based representational activities in human cognition. According to this approach, the prerequisite for knowledge transfer from a source task to a target task is that verbal, logico-mathematical, or visual-spatial symbol systems can be used in similar ways for solving both tasks. More specifically, these symbol systems can be understood as tools that afford certain cognitive activities during reasoning or communication and, at the same time, involve particular constraints that have to be taken into account (Bereiter, 1997; Stern, Aprea, & Ebner, in press). Numbers, for instance, can serve different purposes: As integers they can be used for counting, and as rational numbers they describe the relationship between sets, with different affordances and constraints involved. Integers, for instance, afford the determination of a successor for each number, whereas rational numbers do not. Different kinds of affordances such as these can prevent students from being aware of parallels in the formal structure of problems (Stern & Mevarech, 1996).

Another modern version of E. L. Thorndike and Woodworth's (1901) theory of common elements was developed by Singley and Anderson (1985) on the basis of the cognitive architecture of production systems. If cognitive competencies are understood as the execution of production systems, the transfer of learning from one task to another should be directly related to the number of productions the two tasks share. The authors found empirical evidence for their approach in a study on the use of text editors by showing that the degree of learning transfer from one text editor to another corresponded to the degree of shared production rules.

In sum, modern versions of E. L. Thorndike and Woodworth's (1901) transfer theory emphasize that cognition is based on a large number of specific mental activities and that transfer can occur by detaching these activities from the context in which they were acquired. Applying this theoretical approach to the active and passive use of spoken and written language means emphasizing that the decoding and production of language is guided by the affordances and constraints of the grammar rules of the respective languages. To understand a written or spoken sentence, one has to pay attention to the crucial aspects of the words themselves as well as to the relationships between them. Apart from vocabulary, languages also differ in the elements of a sentence that express the relationship between words and thus guide the meaning. Understanding a Latin sentence, for instance, calls for particular sensitivity to the endings of the words, which serve as case markers in nouns and as time markers in verbs. Failing to recognize the endings of certain words will therefore inevitably lead to misunderstanding. In other languages such as English and the Romance languages, endings play a minor role. Instead, the meaning of a sentence is strongly determined by word order and prepositions. Positive transfer from one language to another can be expected if both languages afford similar ways of making sense of the individual words and therefore have similar underlying constraints for the construction of correct sentences. In the Nuremberg study on

learning Latin (Haag & Stern, 2000), Latin was associated with transfer effects on grammar-related activities. The group with 4 years of exposure to Latin achieved better results than the groups with 2 or 0 years of Latin, both with respect to detecting grammar mistakes in a German text and construction of complex sentences by combining shorter ones.

Commonalities and Deviations Between Latin and the Romance Languages

The Romance languages emerged from vulgar Latin at a time of increasing carelessness in the use of endings. This was due to a growing tendency to accentuate the first syllable, thus resulting in the modification or even disappearance of the less accentuated syllables. Endings in Latin, which are the most valuable part of the word because of their function as case markers, suffered most. Because *digito* may signify either *digitus*, *digitum*, or *digito*, the use of prepositions had to evolve for the sake of clarity. Therefore, the Latin *littera Auli* became *une lettre de Jacques* in French and *una carta de Juan* in Spanish. The genitive, expressed by an ending in Latin, for example, in *caelum*, is expressed by a preposition in the Romance languages. To make sense of a Latin sentence, one has to pay attention to the endings of verbs, nouns, and adjectives, whereas in the modern languages that developed from Latin, this function is fulfilled by so-called empty words, such as articles and propositions as well as by word order.

Given such fundamental differences between the grammar structures of Latin and modern Romance languages, it can be assumed that students who have already been exposed to one Romance language will find it easier to learn a new Romance language than will students who have learned Latin. We also expected there might be negative transfer effects from Latin to Spanish because of the different grammar affordances and constraints of the two languages. Curricular exposure to Latin can, for instance, be expected to lead to the erroneous omission of propositions or auxiliary verbs in Romance languages. In a quasi-experimental design, students who had learned French at school and students who had learned Latin were compared with respect to their performance in translating a German text into Spanish.

Method

At the University of Erlangen-Nuremberg (Germany) a native-Spanish-speaking language teacher regularly offers optional 5-month beginners' crash courses in Spanish. These courses are usually attended by students who need a certificate of Spanish language proficiency because they want to work in a Spanish-speaking country. The courses consist of 15 weekly 2-hr lessons plus homework given after each lesson. The aim of this course is for students to acquire oral and written language skills for everyday use. In the final test, Spanish proficiency is assessed in writing by having the students translate into Spanish a 150-word German text on an everyday situation closely related to topics covered in the course. The translations are evaluated by the Spanish teacher in view of vocabulary and grammar skills. Achievement on this final Spanish test was measured in the winter term of 2000. For this purpose, 76 participants of the course were informed at the end of the 13th session about a scientific study on foreign language learning being conducted by Ludwig Haag. They were also asked to complete a questionnaire as to their age; gender; mother tongue; first, second, and third foreign language learned at school; major subjects at the university; and number of visits to Spanish-speaking countries.

Participants

Fifty female students whose mother tongue was German, whose first foreign language was English (starting at Grade 5), who were aged 20 to 30, and who were majoring in the sciences or in economics participated in the study. All participants had started in Grade 7 with their second curricular foreign language, which was Latin for one half of the participants ($n = 25$) and French for the other half ($n = 25$), and none of the participants had any knowledge of a third foreign language. The mean number of years of second foreign language instruction was 5.75 for the Latin group and 5.32 for the French group. The participants did not have any previous exposure to Spanish and had never, not even for a short period of time, stayed in a Spanish-speaking country.

Control Variables

To control for eventual between-groups differences in variables, which can be expected to impact performance on the Spanish test, the following measures were administered at the end of the course:

1. Final school performance in the second curricular foreign language. Both language groups had to be checked for differences occurring in the achievement level of their second foreign language learning at school. For this, we might have asked the participants to provide their final grades, but the procedure was discarded for three reasons: first, because the participants had received their last grade in their second foreign language 5–10 years ago, they might not remember it exactly, thus giving an erroneous answer; second, this final grade is only one single event and often does not reflect the overall achievement level of a person; third, in Germany, different number grade systems are in use, depending on the Federal State and on the grade level, and this might have caused additional confusion. In our study, we therefore asked all of the participants to rate their final school performance in either Latin or French on a 3-point scale as follows: 1 (*relatively good*), 2 (*average*), and 3 (*relatively bad*). Such self-reported achievement estimations are valid (Möller & Köller, 2000).

2. Time allocated for homework in the Spanish course. In the Spanish course, students were given homework such as learning a certain vocabulary or practicing grammar rules. Here, students were asked to indicate the weekly amount of time allocated to learning Spanish at home using the following scale: 1 (*up to 30 minutes*), 2 (*up to 60 minutes*), 3 (*up to 90 minutes*), 4 (*up to 120 minutes*), and 5 (*up to 150 minutes*).

3. Interest in learning Spanish. Although all participants had opted to attend the Spanish course, the level of interest in the course was also assessed. This was done by including five behavior-oriented items by which the students' current interest in learning Spanish can be assessed (e.g., "If I had enough time, I would study Spanish more intensely" and "Learning Spanish is one of my favorite activities"). The responses were scored on a 4-point scale as follows: 1 (*strongly disagree*), 2 (*disagree*), 3 (*agree*), and 4 (*strongly agree*). A mean interest score was computed for each participant.

4. Verbal intelligence. To assess verbal skills, three subtests of the German version (KFT-13; Heller, Gaedike, & Weinläder, 1985) of R. L. Thorndike and Hagan's (1993) Cognitive Abilities Tests were used: Vocabulary, Word Classification, and Word Analogies. For each participant a raw sum score was computed, which was then z standardized over the entire sample.

Table 1

Means and Standard Deviations of Grammar Errors and Vocabulary Errors in the Spanish Test Made by the Two Language Groups

| | Second curricular foreign language | | | |
| | French | | Latin | |
Error	M	SD	M	SD
Grammar	4.04	2.55	5.88	2.47
Vocabulary	2.88	2.02	3.72	1.40

Dependant Variable: Vocabulary and Grammar Errors in the Final Spanish Test

The number of vocabulary and grammar errors made in the final translation test, which was the basis for the participants' certificates, was provided by the Spanish teacher. In addition, for our study, the Spanish teacher, who did not know which second curricular language the participants had learned at school, assigned the grammar errors to a classification system developed by the authors to find out whether participants from the Latin group had actually made the hypothesized errors of omitting auxiliary verbs and prepositions.

Results

First, the Latin group and the French group were checked for mean differences in the four control variables. No group differences were found in the z scores of verbal intelligence (Latin group: $M = -0.03$, $SD = 0.70$; French group: $M = 0.03$, $SD = 0.70$; $t < 1$), the rating of the final school achievement in the second foreign curricular language (Latin group: $M = 2.00$, $SD = 0.60$; French group: $M = 1.90$, $SD = 0.50$; $t < 1$), the ratings of the weekly time allocated to Spanish homework (Latin group: $M = 1.90$, $SD = 0.70$; French group: $M = 2.20$, $SD = 1.10$; $t < 1.50$), and the interest in learning Spanish (Latin group: $M = 3.24$, $SD = 0.44$; French group: $M = 3.02$, $SD = 0.61$; $t < 1$).

The mean number of vocabulary and grammar errors in the Spanish test are depicted in Table 1 separately for both language groups. A multivariate analysis, with grammar errors and vocabulary errors as the dependent variable, second foreign language (Latin vs. French) as the independent variable, and number of years of exposure to the second curricular language as the covariate, revealed a main effect of the second foreign language, $F(1, 46) = 3.41$, $p < .05$, and no significant effect of the covariate ($F < 1$). Univariate analyses revealed that the French group made fewer grammar errors, $F(1, 46) = 6.86$, $p < .01$, $\eta^2 = .13$, than the Latin

Table 2

Error Categories Developed for the Spanish Test, Mean Number of Errors for Each Category for Both Language Groups, and the Z Values Resulting From the Mann–Whitney Test

| | Mean number of errors | | |
Error category in the Spanish text	French group	Latin group	z score
Verb errors			
An existing form of the verb was constructed, but this form did not correspond to the noun or pronoun: for example, *ella soy* instead of *ella es*. In English, this error would be equivalent to saying *she am* instead of *she is*. Another typical error in this category was *ella trabajan* (she work) instead of *ella trabaja* (she works).	0.76	0.72	−0.09
The conjugation of verbs was incorrect: for example, *bebar* instead of *beber* (to drink; no English correspondence).	1.20	1.16	−0.30
A nonexistent form of the verb was constructed: for example, *ellos trabajabant* instead of *ellos trabajaban* (they worked), or *ellos erant* instead of *ellos eran* (they were), or *él est* instead of *él es* (he is).	0.24	0.72	2.31*
Incomplete present perfect: for example, *tenido* instead of *hemos tenido* (have had).	0.00	0.40	3.04**
Noun errors			
Confusion about the gender of objects: for example, *los casas* instead of *las casas* (the houses).	1.20	1.16	−0.13
Wrong ending of an adjective: for example, *museos interesantos* instead of *museos interesantes* (interesting museums).	0.48	0.32	−0.94
Preposition errors			
Omission of the preposition when describing spatial relationships: for example, *cerca la estación* instead of *cerca de la estación* (near the train station).	0.00	0.32	2.58**
Omission of the preposition when describing quantities: for example, *un litro leche* instead of *un litro de leche* (a liter of milk).	0.00	0.44	3.26**
Omission of the preposition when constructing the genitive case: for example, *No hay tráfico problemas* instead of *No hay problemas de tráfico* (There are no problems with traffic).	0.00	0.36	3.05**
Other errors	0.16	0.28	1.01

*$p < .05$.   **$p < .01$.

group. There was a similar trend for vocabulary errors, $F(1, 46) = 3.03$, $p < .10$, $\eta^2 = .06$.

The Spanish teacher was asked to assign the grammar errors to a classification system developed by the authors. Verb errors, noun errors, and preposition errors were classified into nine subcategories described and exemplified in Table 2. Verb errors occurred because forms were confused within the Spanish language, nonexisting forms were constructed, or the auxiliary verb was omitted when constructing the present perfect. Noun errors were the result of confusions about gender or because the endings of the subject and the adjective did not fit. Preposition errors occurred because prepositions were omitted when describing spatial relationships or quantities or when constructing the genitive case. Of the 248 grammar errors, 237 (97 made by the French group and 140 made by the Latin group) could be assigned to one of the nine categories.

Table 2 includes the mean number of errors for each category made by both language groups and the results of the between-groups mean differences tests obtained by a nonparametric Mann–Whitney U test. As hypothesized, errors made by the Latin group became particularly apparent in the use of prepositions and in the building of verb forms. Also, misconstructions in verbs emerged to be either highly reminiscent of or identical to Latin words.

Discussion

Students who studied Latin at school were less well prepared for learning Spanish than their contemporaries who had learned French at school. The superior performance of the French group was particularly marked in the correct use of grammar rules and was also obvious as a trend in vocabulary skills. The negative transfer effects of Latin on learning Spanish, which became apparent in the analysis of grammar errors, suggest that accessing Romance languages by way of Latin may not only be a detour but may also be a complication. For students with a Latin background, the acquisition of Spanish may often be impeded by so-called "false friends." In other words, superficial similarities between certain words in the two languages may lead to the inappropriate use or modification of these words. Because of the grammar similarities between modern Romance languages, there may be no need for the link function of Latin when learning these languages. The results of the error analysis support the theoretical view of transfer, which was outlined by E. L. Thorndike and Woodworth (1901) about a century ago and has been specified in modern cognitive theories. According to these theories, specific knowledge elements and cognitive activities rather than formal rigor are transferred from one situation to another. This appears to be true for Latin.

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