

# **The relationship between students' foreign language achievement and general thinking skills**

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## **Objectives**

In the framework of a large-scale national survey, students' foreign language skills were assessed to monitor the levels and efficiency of foreign language education. Beyond language skill tests, several questionnaires were also administered to the participating students to collect data about their background. To estimate their general cognitive abilities, an inductive reasoning skill test was also used.

In this paper we will analyze the relationship between students' foreign language skills and their thinking skills to show how general cognitive abilities influence achievements in modern foreign languages. This relationship is to be placed into a multivariate context to show how the observed variables influence language achievements and how thinking skills affect the achievements if the influences of other variables are controlled. In this summary, the main findings of the project are illustrated by the results of some simple multiple regression analyses. In the full version of the paper further and more sophisticated models will also be presented.

## **Theoretical framework**

Recent cognitive views usually emphasize the domain-specific aspects of learning and knowledge. On the other hand, several experiences indicate the broad impact of general thinking skills in several learning situations. In the last decades, in second language acquisition (SLA) research heated debates have focused on how innate language abilities, general cognitive skills and affective learner characteristics contribute to success and achievements. It has been generally accepted that the language learning context and the status of the target language do play an important role, whereas experts have been divided on the issue of how cognitive processes contribute to language acquisition and learning.

The theoretical underpinnings of this study relate to two threads in SLA research. The findings on the acquisition and learning of languages in a foreign language context, where learners have limited access to the target language and it is mostly perceived as a

school subject. Success is expected to be influenced most importantly by two variables: aptitude and motivation. In this study we enquired into one component of learners' aptitude: their inductive reasoning skills, as a standardized test was available from previous educational research. Participants' attitudes and motivation were explored with the help of a questionnaire. The other thread in SLA research relates to the conceptualization and assessment of language proficiency. Although recent years have produced a number of taxonomies of communicative competence, learners' performances are traditionally assessed through the four language skills. In this study we followed this tradition: we tapped into participants' reading and listening comprehension and writing skills. For financial reasons, speaking was beyond the scope of the project. In the choice of tasks and text type, we followed the principles of communicative language testing.

## **Methods**

### *Participants*

A representative sample of Hungarian students was composed for assessing their foreign language skills. Entire school classes were the units for sampling, as well as for data collection. Approximately 300 schools participated in the project. Students of three age groups were assessed: in grades 6, 8, and 10. Altogether, data of more than 28,000 students were collected. Participants were tested on English and German as foreign languages; tests in one of the two languages were administered to those students who study one of them at school (ca. 90 % of the surveyed student population). The thinking skill test and a general questionnaire were administered to all students, even to ones who do study either of these languages, in this way, language choice can also be studied in a multivariate context.

### *Instruments*

Three language skills were assessed: reading, writing and listening. Paper and pencil tests were administered to the students in classroom-size groups. In this summary only the reading test data will be used. The reliability (Cronbach alpha) of these tests varied from 0.94 to 0.96. An inductive reasoning test (composed of verbal analogies, number analogies and number series tasks) was used to assess the students' general cognitive abilities (Cronbach alpha = 0.94). In the full version of the paper the analysis of the other two skills will also be presented.

## **Results and conclusions**

Tables 1 through 6 present the results of the multiple regression analyses carried out with English and German reading test achievements as dependent variables. To make the comparisons easier, the same set of independent variables was used in each regression model. Those variables were included in the model that presumably influence

the reading achievement and strongly correlate with the results of the reading test. These included the achievements on the inductive reasoning test, the parents' educational level (educational levels of the mothers and fathers combined), and students' attitudes and motivation towards studying foreign languages (measured on a 5 point Likert-type scale). Out of data characterizing students' school achievements, their grades in two school subjects were chosen: the grades in the tested foreign language, and the grades in grammar in the mother tongue (L1). These were the summative measures that appeared in the students' end-of-the-semester report card.

In the regression tables, beyond beta coefficients and their significance figures, the correlation of reading achievements and the respective independent variable ( $r$ ), the partial correlation coefficient and the product of  $r$  and beta multiplied by 100 are also presented. This latter data show the proportion of variance of the dependent variable explained by the respective independent variable in percentage.

Table 1. Regression analysis with English reading as dependent variable in grade 6

Independent variable	Beta	t	Sig.	r	Partial r	r·beta ·100
Inductive reasoning	0.291	15.766	0.000	0.468	0.287	13.6
Parents' educational level	0.147	8.783	0.000	0.315	0.165	4.4
Foreign language attitudes	0.087	4.903	0.000	0.279	0.093	2.4
Foreign language school grade	0.171	7.133	0.000	0.444	0.134	7.6
L1 grammar school grade	0.091	3.882	0.000	0.432	0.074	3.9
R square ·100						31.9

Table 2. Regression analysis with English reading as dependent variable in grade 8

Independent variable	Beta	t	Sig.	r	partial r	r·beta ·100
Inductive reasoning	0.302	16.862	0.000	0.506	0.318	15.2
Parents' educational level	0.172	10.492	0.000	0.370	0.205	6.4
Foreign language attitude	0.100	5.620	0.000	0.329	0.111	3.3
Foreign language school grade	0.249	10.254	0.000	0.526	0.200	13.1
L1 grammar school grade	0.061	2.674	0.008	0.465	0.053	2.8
R square ·100						40.8

Table 3. Regression analysis with English reading as dependent variable in grade 10

Independent variable	Beta	t	Sig.	r	Partial r	r·beta ·100
Inductive reasoning	0.312	21.264	0.000	0.463	0.326	14.4
Parents' educational level	0.128	9.135	0.000	0.285	0.146	3.6
Foreign language attitude	0.075	4.757	0.000	0.297	0.077	2.2
Foreign language school grade	0.178	9.528	0.000	0.429	0.153	7.6
L1 grammar school grade	0.122	7.274	0.000	0.390	0.117	4.8
R square ·100						32.6

Table 4. Regression analysis with German reading as dependent variable in grade 6

Independent variable	Beta	t	Sig.	r	Partial r	r·beta ·100
Inductive reasoning	0.275	13.640	0.000	0.424	0.260	11.7
Parents' educational level	-0.051	-2.826	0.005	0.123	-0.056	0.6
Foreign language attitude	0.042	2.155	0.031	0.213	0.043	0.9
Foreign language school grade	0.080	3.053	0.002	0.371	0.060	3.0
L1 grammar school grade	0.240	9.358	0.000	0.434	0.182	10.4
R square ·100						26.6

Table 5. Regression analysis with German reading as dependent variable in grade 8

Independent variable	Beta	t	Sig.	r	Partial r	r·beta ·100
Inductive reasoning	0.318	16.228	0.000	0.465	0.307	14.8
Parents' educational level	0.005	0.292	0.770	0.196	0.006	0.1
Foreign language attitude	0.083	4.266	0.000	0.268	0.085	2.2
Foreign language school grade	0.181	6.819	0.000	0.436	0.135	7.9
L1 grammar school grade	0.108	4.367	0.000	0.419	0.087	4.5
R square ·100						29.5

Table 6. Regression analysis with German reading as dependent variable in grade 10

Independent variable	Beta	t	Sig.	r	Partial r	r·beta ·100
Inductive reasoning	0.260	16.102	0.000	0.416	0.271	10.8
Parents' educational level	0.071	4.601	0.000	0.231	0.080	1.6
Foreign language attitude	0.092	5.315	0.000	0.318	0.093	2.9
Foreign language school grade	0.236	11.496	0.000	0.454	0.197	10.7
L1 grammar school grade	0.104	5.626	0.000	0.381	0.098	4.0
R square ·100						30.0

The figures in the tables indicate some clear and consistent tendencies. (1) In each case, a strong correlation was found between the reading skills and inductive reasoning, these correlation values are among the highest in the tables. (2) When partial correlations are considered, those with inductive reasoning are the highest ones without exception. (3) In these analyses, around 25-40% of the variance of reading achievements can be explained by the effect of the independent variables used in the models. At least a third, sometimes almost half of this can be attributed to the level of inductive reasoning; the proportion of variance explained by inductive reasoning ranges between 10.8 and 15.2%. Each of these figures suggests that inductive reasoning has a much stronger impact on foreign language achievements than any other variable.

These analyses also show that although parents' education is influential, it does not play a decisive role in students' foreign language achievements. This role is somewhat stronger in the case of English than German.

## **Scientific and educational importance of the study**

Although several theoretical approaches to, as well as lay opinions on language acquisition assume that the specificity and uniqueness of language skills are mostly determined by innate language abilities, our results indicate that in an educational context like Hungary, where access to the examined target languages is limited to the classroom, the developmental level of general thinking skills strongly influences learners' foreign language achievements. This finding underpins the claims school administrators and teachers often voice: both processes and outcomes are strongly influenced by students' general cognitive skills. On the other hand, the findings on students' attitudes and motivation towards language learning in general, and classroom tasks in particular indicate that the majority of teachers of foreign languages tends to apply traditional, cognitively demanding, decontextualised tasks, thus favoring cognitively more able students.