The relationships between 8th graders' L1 and L2 reading skills, inductive reasoning and socio-economic status in early English and German as a foreign language programs

Marianne Nikolov [a, *], Benő Csapó [b]

[a] University of Pécs, Hungary
[b] MTA-SZTE Research Group on the Development of Competencies, Hungary

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ABSTRACT

Recent studies have examined how individual differences interact with language choice and achievements. This study analyzes how students' cognitive skills and achievements in English and German reading comprehension depend on parents' level of education. In 2015 data were collected in the Hungarian Educational Longitudinal Program from representative samples of 8th graders A total of 1334 students learned English and 609 learned German. Online tests assessed students' reading comprehension in English and German, their L1 reading comprehension, inductive reasoning and SES. Children of more educated parents tend to choose English. However, in contrast with earlier research, no significant difference was found between the aptitude levels of the two groups. The impact of background variables is stronger in the group studying English. Mothers' education correlates more strongly with reading comprehension achievements in English ($r = 0.401$) than in German ($r = 0.192$). Regression analyses indicate that the impact of inductive reasoning is stronger than that of SES. A stronger relationship was found between inductive reasoning and English reading test results ($r = 0.570$) than with German reading ($r = 0.454$). Background variables influence development in English and German differently. Inductive reasoning plays a more important role in studying English, whereas L1 reading comprehension achievements more greatly impact reading in German.

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1. Introduction

Various models have been proposed and tested to predict how proficiency in modern foreign languages (L2) develops and what best predicts success over time (e.g., Ellis, 2008; Mitchell, Myles, & Marsden, 2013). There is a need to examine how models that work with students of different ages in one context can be applied for young language learners in other educational contexts. In this study, we examine how young learners' reading comprehension skills in their first language (L1 = Hungarian) interact with reading in their foreign languages (L2 = English or German) and what role two other variables play: inductive reasoning and socio-economic status (SES).

In the first part of the paper we summarize some of the relevant publications on previous research into these variables. We discuss how reading comprehension skills in L1 and L2 have been found to interact with one another and look into the role

inductive reasoning and SES play in the level of language proficiency students achieve. Then, we present the main findings on these variables with a special focus on the educational context where the present study was implemented.

In the second part, we analyze the findings of a recent large-scale assessment project involving about 2000 learners of English and German in the last year of their primary-school education (year 8, age 14). By discussing how findings of this study compare to previous research we hope to highlight some recent trends and to offer ideas for further research and recommendations for teaching methodology and language policy.

2. Background to study

The literature on the complex ways in which reading comprehension skills are related in L1 and L2, and what other factors impact their development in the early stages of literacy development is vast (e.g., Baker, 1996; Bialystok, 2002; Cummins, 2000; Hulstijn, 2006, 2015; Koda, 2007; McKay, 2006). The stance proposed by Hulstijn (2006, 2015) offers a sensible starting point for research. He suggests that studies should focus on how language specific cognition interacts with other types of cognition. This is what we set out to examine in the present study.

Inductive reasoning is one of the most often studied general cognitive skills, as it is related both to acquisition (Vainikainen, Hautamäki, Hotulainen, & Kupiainen, 2015) and application of knowledge in new contexts. It is also a key component of problem solving (Resing, Bakker, Pronk, & Elliott, 2016, 2017). There are several approaches to assessing inductive reasoning. For international comparisons culture-free tasks, such as missing pieces of a puzzle, figural matrices, analogies or series are preferred. Whereas in culturally homogenous educational contexts items on verbal or numeric analogies or series work best (Csapó, 1997; Molnár, Greiff, & Csapó, 2013).

There are two reasons for including an inductive reasoning test in the study. First, it is well known that students' SES impacts their school achievement in all domains. However, its impact is not equally strong on different types of achievements. The impact is stronger in fields where the families' cultural capital directly exerts its influence. For example, mothers' vocabulary and the number of books available at home may influence students' language arts performances. Whereas this impact on students' mathematics and science achievements or on their fluid intelligence is less manifest. Among others, this is reflected in the PISA assessments, as for Hungary 21% of the variation in science performance, 23% in mathematics performance and 26% in reading performance is explained by students' SES (OECD, 2010, 2013, 2016). Therefore, it is worth exploring the overall impact of students' SES on L2 achievements, and how much direct impact remains if it is controlled for students' general cognitive abilities. In this study, students' general cognitive ability is measured by an inductive reasoning test. Many intelligence tests (focusing on fluid intelligence, e.g., Raven's Progressive Matrices) include inductive reasoning tasks. In studies on L2 performances an inductive reasoning test is better for the purpose of a control variable than an intelligence test because of its clearer validity, and also because inductive reasoning is also trainable and it is amenable to education (Klauer & Phye, 2008).

The second reason is that language learning involves inductive processes. Language learning aptitude has been found to be the most important predictor of mastering an L2 in a range of studies, including ones on Hungarian L2 learners (Kiss & Nikolov, 2005; Ottó & Nikolov, 2003). As aptitude measures tend to include inductive reasoning, a validated test was used. Mastering grammar rules from examples and learning word meanings in context involve inductive processes. This involvement of inductive processes may vary from student to student (e.g., Felder & Henriques, 1995 distinguished inductive and deductive learners), and may be different for different languages as well. Previous studies involving Hungarian learners of English and German found differences in how strongly inductive reasoning predicted L2 proficiency. For example, Csapó and Nikolov (2009) concluded that inductive reasoning assessed in Year 6 correlated with Year 8 English reading, writing and listening at 0.446, 0.475 and 0.359 respectively, whereas the same correlations for German skills were 0.345, 0.391 and 0.252.

As for students' socio-economic status, a number of different indicators have been used to characterize SES. International studies (such as Programme for International Student Assessment, PISA) apply a number of different background variables. As the impact of these may vary from country to country, cross-country comparisons are more valid if a broad array of variables is used (Kuger, Klieme, Jude, & Kaplan, 2016). Out of these variables, in PISA a complex index of economic, social and cultural status (ESCS) is composed (OECD, 2016). As usually strong correlations are found between the background variables, for national assessments, fewer variables suffice to meaningfully represent students' SES. For example, in Hungary, type of settlement does not have a unique contribution to the variance in students' achievements. Although there are large differences between learners' achievements in villages and cities, these are fully explained by the differences in the educational level of the students' parents living in these two environments. So far the single best SES variable explaining most of the variance in students' achievements has been their mothers' level of education (Csapó, 2003).

It is known from international and national assessments that in Hungary there is a particularly strong relationship between students' school achievements and their SES. For example, in the latest PISA assessment of science, Hungary showed the second largest difference between disadvantaged and non-disadvantaged students in the odds of achieving scores below level two (OECD, 2016, p. 222). Similarly, the ratio of resilient students (who are in the bottom quarter of the PISA index of economic, social and cultural status but perform in the top quarter) is very low (OECD, 2016, p. 223). A cross-sectional study based on large representative samples of the Hungarian school population has indicated that students whose mother has a university degree reach the same developmental level by year 7 as students whose mother has eight years or less schooling by year 11 (Csapó, 2003).