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Assessing the Relationship Between L1 Knowledge and Fluid Intelligence in Second Language Acquisition: The Case of immigrant students in Catalonia.

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Abstract

The linguistic interdependence hypothesis posits the existence of language features common to different languages. This set of characteristics, known as Common Underlying Proficiency (CUP), is a powerful facilitating agent in second language acquisition. Fluid intelligence (Gf), on the other hand, is the construct that encompasses those cognitive resources devoted to general learning, and its involvement in second language acquisition is unproven. The aim of this study is to determine the direct and interactive effect of L1 knowledge and Gf on second language acquisition in language immersion learners across different linguistic domains. The study analyzed the proficiency of 131 Romanian students in Spanish and Catalan, the official languages of Catalonia. Mixed-effects regression models were used to analyze lexical, morphosyntactic, and orthographic aspects. The results were obtained using mixed-effects regression models, revealing a particularly noticeable interdependence effect in lexical, morphosyntactic, and orthographic aspects, with differences between Catalan and Spanish. Furthermore, Gf had an impact on the morphosyntactic component with similar intensity for both languages but did not moderate the interdependence effect. The study discusses the possible causes of these effects, as well as their psycho-pedagogical consequences.

Keywords: Cross-linguistic influence; Fluid intelligence; Second language acquisition; Linguistic immersion; Mixed-effects model.

Word count: 6.637

Introduction

One of the most characteristic phenomena of the second language learning process is the use of psycholinguistic resources that have been consolidated during the acquisition of languages already learned. The term cross-linguistic influence (CLI, Berthele and Lambelet, 2017: 9) encompasses the set of processes associated with the causal relationship between the languages known by a speaker. While this phenomenon can accelerate the learning of a second language (Ringbom, 2007, Senar et al., 2023a), its effects are particularly important in the case of immigrant learners; the speed and efficiency with which these students acquire the language of the host territory predicts a successful integration in their new environment (Cavicchiolo et al., 2020; Kagitçibaşi et al., 2017) and their ability to achieve their academic goals (MacSwan and Rolstad, 2010).

CLI addresses the set of interactions that occur between the myriad of elements comprising the languages in contact, spread throughout the different language domains (Jarvis and Pavlenko, 2008). However, not all elements are equally likely to participate interactively for both languages. Transferability (Kellerman, 1978, 1995) refers to the ability of linguistic features to participate in the different languages mastered by the speaker and may depend on cognitive aspects (Odlin, 1989; Prevoo et al., 2015), psychosocial aspects (Sierens et al., 2019) and the context in which learning takes place (Melby-Lervåg & Lervåg, 2011), as well as the typological distance between languages (Myles, 2002; Otwinowska et al., 2020). However, literature seeking to explore such effects in language immersion contexts remains scarce.

Consequently, the aim of the present research consists in studying the capacity of the cognitive components of fluid intelligence to exert both a direct and a facilitating effect on linguistic knowledge transfer in the different language domains. This study was carried out in Catalonia (Spain), and the sample consisted of young immigrants of Romanian origin living in a linguistic immersion context. Given the linguistic features of the Catalan territory, this phenomenon was studied in its two official languages (Spanish and Catalan).

Cross-linguistic influence (CLI): Theoretical approaches

Although no current theory provides a complete and robust explanation of the psychological nature of cross-linguistic influence processes (Chung et al., 2019), there are numerous hypotheses that espouse an approach to the effects emerging from such interactions.

One of the hypotheses that has received most attention in the field of psycholinguistics is the linguistic interdependence hypothesis (Cummins, 1979), which proposes the existence of a set of psycholinguistic components common to the different languages a person could acquire, referred to as Common Underlying Proficiency (CUP). CUP encompasses cognitive (e.g., memory, auditory discrimination, abstract reasoning) and metacognitive (e.g., phonological awareness) skills, as well as conceptual knowledge (Cummins, 2000). Assuming the existence of CUP implies that the different languages a person possesses operate, at least in part, using the same cognitive mechanisms (Cummins, 2017; Goodrich and Lonigan, 2017). Thus, according to this hypothesis, the speed of second language acquisition would be conditioned by the extent to which the components of CUP have been developed through the first language.

Riches and Genesee (2006) asserted that research based on cross-language correlation studies provides enough evidence for the existence of CUP. However, authors such as Castilla et al. (2009) have called the validity of these premises into question, mainly because a lack of knowledge of the mechanisms underlying CUP does not allow us to assume a causal relationship between L1 knowledge and L2 knowledge, nor does it permit us to establish a causal relationship between L1 knowledge and the speed of L2 development. As an alternative, these authors proposed that the correlations observed between languages are not a consequence of the existence of CUP, but of individual differences in language learning, since learners would acquire the L2 through the same cognitive mechanisms as they acquired the L1. According to this premise, learners who experienced more difficulties acquiring a linguistic element in L1 will also have difficulties acquiring it in L2.

Castilla et al.'s (2009) proposal is not new. Geva and Siegel (2000) had already suggested, in their *central processing hypothesis*, that basic cognitive processes (e.g., executive functions) and higher cognitive processes (e.g., self-regulation) could explain these correlations. In contrast to the linguistic interdependence hypothesis, this hypothesis considers that those cognitive mechanisms that are independent of linguistic knowledge but related to its learning act in an interrelated way for the learner's different languages. Numerous studies provide evidence in favor of this, showing that non-linguistic cognitive abilities (e.g., decoding ability, phonological awareness) reveal higher correlation rates than linguistic skills (Lechner and Siemund, 2014; Melby-Lervåg and Lervåg, 2011; Proctor et al., 2017; Riches and Genesee, 2006; Rolstad and MacSwan, 2014).

Fluent intelligence and second language acquisition

According to the Cattell-Horn-Carrol model (CHC; McGrew, 2005; Schneider and McGrew, 2012), fluid intelligence (Gf) is a construct that encompasses the set of mental operations related to problem-solving that do not require prior rote learning. These include inference, comprehension, hypothetical-deductive thinking, concept extrapolation and transforming information (McGrew, 2009). Thus, Gf is understood as the set of cognitive functions aimed at learning new skills, especially when dealing with new situations (Kvist and Gustafsson, 2008, Watkins et al., 2007).

While Gf has been shown to be closely related to learning in the context of general education (e.g., Primi et al., 2010; Schneider and Niklas, 2017; Saß et al., 2021), the relationship between Gf and second language acquisition is less evident. In fact, although the results of classic studies such as those conducted by Genesee (1976) and Sasaki (1993) suggested that Gf is a key element in explaining the rate of second language acquisition, current research suggests a more modest involvement. Thus, studies conducted by Pishghadam and Khajavy (2013) and Senar et al. (2023b) showed that fluid intelligence did not explain more than 12.2 % of the variability observed in a group of Iranian learners of English, while the work done by Ahmed (2013) and Debatin et al. (2019) concluded that intelligence had an insignificant effect on the acquisition of English as a second language.

The disparities in the findings of these studies highlights a lack of understanding of the way in which Gf acts on the process of second language acquisition. Consequently, and considering the hypotheses mentioned in the previous section, the present study also

aims to determine the effect of Gf on language acquisition in its different domains and whether this effect is related to the linguistic knowledge already acquired in the L1.

CLI across linguistic domains

The empirical study of linguistic interdependence effects has shown that the underlying mechanisms are not the same for different language domains, and that they affect the transferability of their elements. In the case of the lexical domain, the degree of transferability is strongly related to the presence of cognates, that is, lexemes that share formal and semantic features across languages (Otwinowska, 2016). Thus, when second language learners encounter a cognate, they automatically attribute to it the same syntactic and semantic features that the L1 word has associated with it, facilitating its learning.

A similar process occurs in orthography, where words with high orthographic similarity in the L1 facilitate the learning of the corresponding words in the L2, dragging with them associated lexical-semantic and syntactic elements (Comesaa et al., 2012). As a result, the degree to which lexical, orthographic, and semantic components of different languages interact is largely determined by their similarity.

Regarding the morphosyntactic domain, research shows similarities and differences with the lexical domain. The similarities, which are related to the ability to use knowledge already learned in the first language, are evident in studies such as that conducted by Vasilyeva et al. (2010). This research showed how young speakers of Spanish and English are more likely to use passive structures in one language if they

have just used the same structure in the other language. Another example proceeds from the study by Hsin et al. (2013), which showed how young English learners of Spanish use structures they have just heard in their language (e.g., white car) and reproduce them in the target language, even though they are grammatically incorrect (e.g., *"blanco coche"). However, the learning of the morphosyntactic features of a language is also guided by several abilities related to general learning. These abilities are devoted to finding patterns of speech segmentation, altering the order of learned structures, or retaining the different parts of a sentence in working memory so as to understand it comprehensively (van Dijk, 2021).

Finally, for the phonetic domain, it has been observed that, in terms of both comprehension and production, speakers have difficulties to adapt to the phonemes of the language in acquisition. One explanation for this phenomenon is provided by the Speech Learning Model (Flege, 2005), which considers that the gradual degradation of neural plasticity mechanisms hinders the generation of new phonetic categories. This explanation is consistent with the empirical findings of de Groot (1992), who documented a higher transfer speed and greater accuracy in the phonetic execution of cognate words. Consequently, the efficiency with which second language phonemes are acquired will depend on the age at which acquisition begins and the perceived difference between the phonemes to be acquired and the phonemes already acquired in the L1 (Flege and Bohn, 2021).

The present study

Essentially, the hypotheses outlined in the previous paragraphs disagree on the nature of the cognitive mechanisms that underly the cross-linguistic influence effect. While the

linguistic interdependence hypothesis considers such effects as the result of the shared action of mechanisms that are essentially linguistic, the central processing hypothesis asserts that these mechanisms are the same as those that underpin learning in general.

Beyond the theoretical interest of resolving this controversy, assuming one or the other hypothesis to be true has important pedagogical consequences. If the interrelation between languages is the consequence of interdependent linguistic mechanisms, second language learners will be able to make use of their knowledge in L1 independently of their general learning ability. However, if the observed correlation between languages is explained by the mechanisms underlying learning in general, then learners will not be able to use their L1 for the benefit of L2 learning, since this learning will depend primarily on their very ability to learn, or, in other words, on their Gf.

All, however, both theories are likely to be partially valid, as the empirical study of different linguistic domains suggests. That is, although second language learning is subject to processes of linguistic interdependence, it also requires the intervention of general learning mechanisms. In this case, and as the CLI literature suggests (Jarvis and Pavlenko, 2008; Odlin, 1989), it is reasonable to think that both factors may be involved in second language learning in an interactive way. In other words, learners' ability to use their first language for second language learning will depend, in part, on their Gf. Consequently, the present study aims to determine the direct and interactive effect of L1 (henceforth heritage language, or HL) and Gf on second language learning in young immigrants in a language immersion context.

This research was conducted in Catalonia, a Spanish autonomous region with two official languages: Catalan and Spanish. The Catalan territory has experienced an unprecedented growth in the population of immigrant origin during the last twenty years, transforming the socio-demographic characteristics and educational needs of its school-age population (Ubalde et al., 2023). To cope with this new demand, the education authorities have promoted a policy of language immersion, with the goal that all students, regardless of their country of origin, achieve an acceptable command of the two official languages upon completion of compulsory education (Lasagabaster, 2017). However, different uses are made of each language in the educational context; Catalan is the language of instruction for most of the academic content taught, while Spanish is reserved for a small group of subjects, including a subject devoted to learning the language itself.

However, the young people object of this study are in a situation of linguistic immersion, meaning that language learning goes beyond what is acquired through academic teaching-learning processes. In this sense, sociolinguistic studies show how, in general terms, the immigrant population tends to adopt Spanish as their preferred language of use, an effect known as the 'pattern of subordination to Spanish' (Boix and Vila-Moreno, 1998). Thus, the way in which young immigrants use and practice these languages is asymmetrical; Catalan is the language most used in the academic environment and Spanish the language of preference for non-academic contexts (Nussbaum, 2005).

The Romanian immigrant group chosen for this study has 143,430 members within the Catalan territory, representing approximately 2% of the total population (Idescat, 2021).

Its heritage language, Romanian, is relatively similar to the languages of the Catalan territory, as all three are Romance languages belonging to the Indo-European family, derived from Latin. Regarding the lexical component, Romanian shows similarity coefficients with the two languages of the territory, although this is slightly higher for Catalan (.73) than for Spanish (.70) (Ethnologue, 2021). With regard to morphosyntax, although the syntactic structure of Romanian follows a similar pattern to the local languages (noun-verb-object), its main difference lies in the way articles are used (in Spanish and Catalan they are lexemes placed before the noun, while in Romanian they are placed as a suffix to the noun) and gender (Romanian uses the neuter gender, while the host languages only use masculine and feminine). However, in terms of phonetics and orthography, Romanian is closer to Catalan than Spanish, as they are languages with a higher degree of opacity (referring to phoneme/grapheme ambiguity).

In summary, the research questions addressed in this study are as follows:

RQ1: Can the language competences acquired in the HL have a direct effect on learning the languages of the host territory? If so, which language domains are most influenced by this effect?

RQ2: Can Gf have a direct effect on learning the host territory languages? If so, which language domains are most influenced by this effect?

RQ3: Can Gf moderate the facilitating effect of HL on learning host territory languages? If so, which language domains are most influenced by this interactive effect?

Based on the literature described in the previous paragraphs, a direct and positive effect of HL towards the two host languages was hypothesized for all language domains, and an especially strong one for the lexical, morphosyntactic and orthographic domains.

Regarding Gf, a positive direct effect was hypothesized for all language domains, this being especially strong for the morphosyntactic domain. Finally, regarding the interaction effects, and considering the direct effects hypothesized for HL and Gf, a possible moderating effect of Gf was hypothesized for the morphosyntactic domain.

Methodology

4.1. Participants

The present study consisted of a sample of 131 students (74 girls and 57 boys; M age = 15.06, SD = 1.58), who were in compulsory secondary education in Catalan secondary schools at the time the tests were administered. All the participants were originally from Romania and had been living in this territory for several years. In reference to language use, 45% of the participants reported that they made exclusive use of the HL in their home environment, while 55% claimed to make use of both the HL and the official languages of the host territory (Catalan and Spanish).

4.2. Instruments

4.2.1. Language competences

To ascertain the level of competence in the different language domains, most of the tasks included in the language competence tests designed by Bel et al. (1991, 1993) for the Servei d'Ensenyament de Català (Catalan Teaching Service, or SEDEC) were used. These tests were designed for the Catalan context and are frequently used for scientific purposes (e.g., Huguet et al., 2012, 2013; Oller and Vila, 2011), showing adequate levels of reliability and validity.

At the same time, and with support from the Romanian Ministry of Education and the supervision of Romanian language teachers, a parallel test was constructed to assess the participants' knowledge of the heritage language.

The administered tasks were distributed as follows:

Phonetics

- Phonetic comprehension. The examiner reads to the learner sets of words whose phonetic similarity may create confusion. The learner has to discriminate correctly between these words.
- Phonetic production. This section is subdivided into two parts:
    - Sound reproduction. The pupil has to correctly pronounce the name of different objects represented through drawings.
    - Reading phonetics. The student has to read a text and then reproduce it aloud. The number of phonetic errors is counted.

The total value assigned to this test is 100 points, of which the subtests "phonetic comprehension" and "phonetic production" are assigned 33 and 67 points, respectively.

Morphosyntax

- Formation of plurals. Students are given a series of sentences, which they have to transform by gender and number. For example, the sentence "X" is given and the learner has to transform it into "Y".

- Verbal inflection, derivation. Students are given a series of verbs and verbal expressions, which they have to adapt to the rest of the sentence by means of derivations.

- Word substitution. Students have to add an expression to a series of sentences, choosing from three response options. Qualifiers, determiners, pronouns, verbal periphrases and prepositions are tested.

- Identification. Students have to extract three nouns, three adjectives and three verbs from a short text administered in written form.

- Written expression errors. Students are asked to write a text on a choice of three topics. The morphosyntactic errors are counted.

The total value assigned to this test is 100 points, of which the subtests "formation of plurals", "verbal inflection", "word substitution", "identification" and " written expression errors" are assigned 10, 25, 25, 10 and 30 points, respectively.

Lexicon

- Reading comprehension. This section is divided into three subtests:
  - Information identification. Students have to read a short news item and then answer five questions in writing.
  - Lexical comprehension strategies. Students have to read a text and fill in the missing words.
  - Word identification. Students have to complete a series of sentences presented in written format with antonyms and synonyms.

- Written expression. Students have to write a text chosen from three topics. Lexical errors are counted.

The total value assigned to this test is 100 points, of which 50 points are assigned to the subtests "oral expression" and "written expression", respectively.

Orthography

The analysis of orthographic aspects was carried out by means of a single test, whereby the students had to write eight sentences dictated by the examiner in which 18 elements representing the main orthographic difficulties of the languages studied were selected.

4.2.2. Fluid intelligence

Gf was measured using the G2A version of the Cattell and Cattell (1990) "g" Factor Test. Widely used in studies designed to determine level of intelligence, this test generates IQ values while minimizing the use of linguistic, cultural and educational aspects not desirable for the purpose of the study. The test is composed of 46 items, distributed among four subtests (series, classification, matrices and conditions).

Studies conducted in Spain have reported Cronbach's alpha reliability coefficients of between .69 and .73. For the present research, the test reported adequate values: $\alpha = .71$, $\omega = .70$, AVE = .50 and CR = .71.

4.2.3. Sociodemographic variables

Participants answered questions regarding their age, gender, age of arrival in Catalonia and the use of language in their family environment through an ad hoc questionnaire designed by the researchers.

4.3. Procedure

The tests were administered by trained examiners in classrooms at the students' schools. The time of the evaluation session was 120 minutes.

The study was approved by the Government of Catalonia's Department of Education and written informed consent was requested from both the participants and their parents or legal guardians, thus guaranteeing the anonymity and confidentiality of the information collected in accordance with the ethical guidelines of the European Commission (European Commission, 2010).

Data analysis was performed using the IBM SPSS software package version 26 and the Ime4 statistical package of the R programming language (Bates et al., 2014).

5. Results

5.1. Descriptive statistics and bivariate correlations

Table 1 shows the descriptive statistics and Pearson's correlation coefficients for the variables included in the different models. The descriptive scores correspond to the original values obtained in the different tests.

[TABLE 1 NEAR HERE]

5.2. Direct and moderating effects of HL and Gf on second language proficiency: Mixed effects model.

In order to determine the direct and interactive effects of the variables "HL competences" and "Gf" on each of the languages of the host territory, mixed-effects

models were designed, with a parametric bootstrapping process being implemented to reduce the standard error associated with the use of small samples. Taking into account the four language domains and the two languages of the host territory, eight different models were designed. The variables "HL competences" and "Gf" were introduced into the models as fixed effects. Moreover, participants were grouped by age of arrival (less than 3 years, 3 to 6 years, 6 to 9 years, more than 9 years) and entered into the model as a random effects variable to control for their effect on the dependent variable. The standardized parameters of the different models are shown in Table 2.

[TABLE 2 NEAR HERE]

With respect to phonetic competence, the models showed an explanatory power of 16.8% for the Spanish language and 8% for Catalan. The HL and Gf variables did not show significant explanatory power for either language. Interaction effects were not significant.

As regards morphosyntax competences, the models showed an explanatory power of 32.3% for Spanish and 46.1% for Catalan. The HL and Gf variables showed significant explanatory power for competences in both languages. The interaction effects were not significant in this case either.

As for the lexical domain, the models showed an explanatory power of 23.8% for Spanish and 24.9% for Catalan. The HL variable showed a significant explanatory power for Spanish and Catalan language proficiency of similar magnitude for both languages. In contrast, the variable Gf did not show an effect with HL, either directly or interactively.

Finally, the models referring to the orthographic domain showed an explanatory power of 35.1% for Spanish and 36.3% for Catalan. Thus, for the orthographic component, the HL variable showed a significant effect, which was of similar magnitude for both languages. On the other hand, the variable Gf did not show an effect either directly or through its interaction with HL.

6. Discussion and conclusions

In order to answer the research questions posed, the present study analyzed the direct and interactive effect of the variables HL and Gf on language skills acquired by young immigrants of Romanian origin in the two official languages of the Catalan territory.

In relation to the first research question, concerning the direct effects of HL on L2, the results showed that HL proficiency significantly explained the variability observed in the level of competence in the host languages for the lexical, morphosyntactic and orthographic domains. These results reaffirm the hypothesis of linguistic interdependence (Cummins, 1979), suggesting that young learners make use of the linguistic skills learned in their first language to favor second language learning for these language domains.

Regarding the results for morphosyntax, the magnitude of the effect of HL on Catalan was substantially higher than for Spanish. Although Catalan and Spanish are similar languages in morphosyntactic terms, the reason for this difference could be the way in which young people are exposed to learning these languages (Melby-Lervåg and Lervåg, 2011); in other words, the vehicular use of Catalan for learning academic

content could facilitate the transferability of morphosyntactic elements. Naturally, these results are tentative and further research would be necessary to confirm this assumption.

With respect to the second research question, the results showed a direct and significant effect of Gf on the morphosyntactic skills acquired in both languages. In line with the original hypothesis, these results suggest that the cognitive abilities captured in Gf facilitate the acquisition of the morphosyntactic elements of second languages in contexts of language immersion, assisting mental operations such as language segmentation or the alteration of already learned structures (McGrew, 2009; van Dijk, 2021). Indeed, it is equally important to note that the domains of phonetics, lexis and orthography are not subject to a significant Gf effect, suggesting that, for these domains, the rate at which young learners acquire the languages of the host territory will be independent of their general learning abilities.

Finally, in response to the third research question, the results did not reveal an interactive effect between HL and Gf on any of the second languages or in any of the linguistic domains studied. While positions such as those adopted by Odlin (1989), Jarvis and Pavlenko (2008) and Prevoo et al. (2015) argue that the transferability of linguistic elements is moderated by cognitive aspects, the results of our study suggest that, in the case of young immigrants in a language immersion context, the cognitive aspects of Gf are not involved in the transferability of linguistic elements in the domains studied. These results have pedagogical implications of great relevance, as they suggest that these students make use of the knowledge acquired in their HL learning in favor of second languages independently of their general learning abilities.

It is also important to point out that, although phonetic proficiency did not reveal a direct effect of HL or Gf, a significant correlation was observed between HL and the languages of the host territory. These results could be explained by the participation of other mechanisms, not included in Gf and not related to strictly linguistic skills, which participate in the learning of the different languages, in accordance with the abilities of each speaker. Elements such as the ability to create motor coordination units (Browman and Goldstein, 1986) or the capacity for phonetic categorization (Flege and Bohn, 2021) could be behind such correlations. Further research will be necessary to test these hypotheses.

Despite the scientific relevance and pedagogical implications of the conclusions derived from these results, it is important to consider that the present study contains limitations that should be taken into account in future research. Firstly, the sample was composed of learners with Romanian as an HL, a language relatively close to the languages of the host territory. It would be interesting to know whether, as suggested by works such as those conducted by Myles (2002) or Otwinowska et al. (2020), the intensity with which HL exerts an effect on second languages is reduced as a function of linguistic distance, where the presence of cognates and the similarity between syntactic structures is lower. On the other hand, the present study inferred the effect of HL and Gf through the variability observed in second languages at the time of the test. Therefore, it would be interesting to reaffirm these phenomena through longitudinal experimental designs that would allow us to evaluate the intrasubject effects and increase in proficiency as a function of time.

In conclusion, the results of the present study show how, in the case of young immigrants in the context of language immersion, and for the lexical, morphosyntactic and orthographic domains, the linguistic skills acquired in second languages are nourished by those acquired in the HL, as stated by the linguistic interdependence hypothesis. At the same time, the learning mechanisms described in Gf facilitate the acquisition of the morphosyntactic aspects of second languages, in accordance with the central processing hypothesis. Consequently, both theories would be partially valid and not mutually exclusive.

Supplementary material

The parallel test for the measurement of language skills in Romanian can be found at the following link:

http://www.grelie.udl.cat/wp-content/uploads/2022/06/Prueba-de-competencias-en-lengua-rumana_Optimizer.pdf

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Table 1.

Descriptive and Pearson correlation statistics among the variables comprising the different models

Measure	M	SD	1	2	3	4
Phonetics (PHO)						
1. Gf	102.92	17.25	_			
2. PHO HL	93.8	6.12	.124	_		
3. PHO Spanish	78.84	11.65	.152	.182*	_	
4. PHO Catalan	77.86	8.99	.129	.219*	.269*	_
Morphosyntax (MS)						
1. Gf	102.92	17.25	_			
2. MS HL	50.8	17.11	.-.058	_		
3. MS Spanish	63.71	22.45	.346*	.302*	_	
4. MS catalan	52.07	20.28	.368*	.389*	.806*	_
Lexicon (LEX)						
1. Gf	102.92	17.25	_			
2. LEX HL	70.4	15.2	.047	_		
3. LEX Spanish	65.13	14.63	.280*	.242*		
4. LEX Catalan	69.62	12.24	.187*	.346*	.568*	_
Ortography (ORT)						
1. Gf	102.92	17.25	_			
2. ORT HL	62.47	20.64	-.020	_		
3. ORT Spanish	70.91	19.49	.224*	.406*	_	
4. ORT catalan	77.22	15.27	.157	.488*	.704*	_

Note. * $p < .05$

Table 2.

Explained variability of different linguistic domains in host languages as a function of HL and IQ. Direct and interaction effects.

	Spanish				Catalan			
	R^2	*β*	*SE*	*t*	R^2	*β*	*SE*	*t*
Phonetics	.168				.080			
HL		.075	.111	.674		.057	.113	.506
IQ		.259	.163	1.593		.044	.130	.337
HL*IQ		.080	.095	.844		.139	.190	.731
Morphosyntax	.323				.461			
HL		.450**	.091	4.960		.625**	.105	5.930
IQ		.253**	.081	3.132		.188*	.092	1.981
HL*IQ		.037	.083	.443		-.030	.085	-.359
Lexicon	.238				.249			
HL		.334**	.084	3.970		.379**	.087	4.380
IQ		.179	.085	2.106		.148	.079	1.869
HL*IQ		.118	.085	1.375		.010	.081	.126
Orthography	.351				.363			
HL		.553**	.104	5.336		.570**	.095	5.790
IQ		.121	.101	1.198		.139	.127	1.090
HL*IQ		.102	.085	1.194		.069	.152	.453

Note. * $p < .05$; ** $p < .01$