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Latin American Students and Language Learning in Catalonia: What does the Linguistic Interdependence Hypothesis show us?

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Abstract. The massive arrival in Spain of students of immigrant origin has visibly altered the traditional configuration of schools, where ethnic, cultural and linguistic diversity is becoming increasingly manifest. This situation is worth being mentioned insofar as it affects all the different autonomous communities in the country, even more clearly Catalonia, where the educational system is organized under the parameters of bilingual education. One of the theoretical constructs supporting this educational model is the Linguistic Interdependence Hypothesis, developed by Jim Cummins at the beginning of the 1980s. According to the author, whenever the instruction in a given language (*Lx*) takes place under certain conditions, competence acquired in this language can be transferred onto another (*Ly*). Bearing this theoretical construct in mind, our study focuses on a sample of 237 Spanish-speaking subjects (123 native and 114 immigrant students) who completed a series of parallel tests evaluating their skills in Catalan and Spanish. Drawing on the data analyzed we can conclude that the Hypothesis accounts for the results in both native and immigrant students with the same L1.

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Migration flows have visibly altered Spain's social configuration over the last decade[1]. In open contrast to similar phenomena occurring in neighboring countries, the rapid increase in the number of citizens coming from abroad has taken place in a relatively short lapse of time. The intensity of the process becomes even more evident when analyzing some figures published by the statistical office of the European Union (Eurostat, 2011). According to these data, Spain was hosting the second highest rate of foreign citizens living in a European country in 2010 (5,663,500), second only to Germany (7,130,900). This sets Spain apart from other countries with a much longer tradition in the reception of immigrants, as for instance the United Kingdom (4,367,600), Italy (4,235,100) or France (3,769,000).

It is true that in Spain this phenomenon has not affected all territories equally. Catalonia, with 1,183,907 foreigners registered, is the Autonomous Community with the highest number of recently arrived citizens (Instituto Nacional de Estadística, 2012). As a consequence of family regrouping dynamics, and also due to other factors, such as the number of births in the host country or political and military conflicts, among others (Vertovec, 2007), schools have not been left unaffected (Defensor del Pueblo - Ombudsman, 2003). For the last decades, as far as pre-university education in Spain is concerned, the number of students of immigrant origin has moved from 141,916 (2000–01 academic year) to 770,384 (2010–11), representing 9.5% of the overall number of students in the country (Ministerio de Educación, 2011). As was the case with general population, these common dynamics have far-reaching implications for the Catalan educational map, as more than 20% of immigrant students in Spain attend Catalan schools - around 150,000 (Departament d'Educació, 2010).

Despite the diverse origin of immigrant students in Spain, we must stress the fact that most of them (more than 40%) come from Latin America, where various indigenous languages are commonly spoken along with those introduced in colonial times. Although some students may have these other languages as L1, the majority are L1 speakers of Spanish (Spain's majority and official language). This situation, again, sets the country apart from other countries either in Europe, Canada or the USA.

By and large, immigrant students on arrival in Catalan schools (irrespective of their origin) lack good command

[1]Even in the current context of global economic crisis, immigration rates in Spain are quite stable. Only a slight decrease (.7%) has been observed in the number of immigrant citizens in the country in the 2011–12 period (Instituto Nacional de Estadística, 2012).

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of the language of instruction (L2) in Catalonia (Catalan), which shares co-official status with Spanish but has very limited impact beyond the regional borders. This case is particularly relevant as, since the beginning of the 1980s, with the aim of guaranteeing a similar degree of competence in both languages, the educational system was organized on the basis of immersion programs aimed at native Spanish-speaking students. We would like to underline that such programs have played a key role in the revitalization of Catalan in the region, and that they have not been detrimental to the levels of competence in Spanish or other basic curricular abilities (Huguet, 2007).

Against this general backdrop of success[2], many researchers advocate for the implementation of immersion programs with immigrant students, in general, and more particularly as regards Latin American students. When it comes to the latter group, the driving principle is rather simple. These programs were successful when implemented with Spanish-speaking students born to migrant families arriving in Catalonia, between the 1960s and 1970s, from other Spanish regions. In the light of these results, nothing should prevent these same programs from succeeding with Spanish-speaking immigrants. However, we would be running the risk of oversimplifying the whole panorama, as using "the same" L1 does not make both groups comparable. In contrast to the situation three decades ago, the areas of the cities where immigrant families live nowadays are characterized by multilingualism, whereas Spanish monolingualism was the general trend back in the 1970s. Moreover, the relocation of native students in schools far away from immigration areas has generated artificial school populations that are more linguistically heterogeneous than they used to be at the time. On the other hand, there is no doubt as to the fact that the attitudes of the population towards Catalan and Spanish at the end of the Franco dictatorship were not the same as those shown by Latin American citizens nowadays (Serra, 2010; Vila, Oller, & Fresquet, 2008).

As it happens with regard to students' general academic work (Alonso-Tapia & Simón, 2012), it is commonly accepted that a favorable stance towards a given language is a necessary pre-condition for effective learning and acquisition (Baker, 1992). Based on data from the Catalan context, Huguet, Janés, and Chireac (2008) analyzed language attitudes towards Catalan and Spanish in a sample of 225 immigrant students in Compulsory Secondary Education. Apart from the large number of Latin American students, other territories were also incorporated into the study: the Maghrib region, Sub-Saharan Africa, Asia, Eastern Europe and the European Union. Several variables were controlled, but here we are mainly concerned with L1 influence: Latin American students privileged their own language over Catalan whilst in the rest of groups the tendency was just the opposite (that is, Catalan was more positively valued than Spanish).

Similar conclusions can be drawn from Lapresta, Huguet, and Janés (2010) as far as the impact of home language and geographic origin is concerned. The authors studied language attitudes as deployed in the discourse collected in extensive interviews with 19 native and 16 immigrant students. The analysis showed that those students in the sample who felt positively valued and socially integrated in the region developed more favorable attitudes towards Catalan and Spanish. It is particularly worth highlighting the position adopted by some Spanish-speaking Latin American informants with regard to Catalan. As they were fluent in Spanish, which is also used (and co-official) in Catalonia, they did not perceive the need to learn Catalan. Conversely, they thought other immigrant students, speakers of an L1 other than Spanish, should learn Catalan. They even thought these other students were more capable of learning Catalan than Spanish-speaking Latin American students. Furthermore, there was a common phenomenon affecting most Latin American students in the sample analyzed in the study: whereas they showed very favorable attitudes towards Spanish, the reverse held true towards Catalan. This was also the case of the Maghribian students in our sample, although both groups grounded their views on different arguments. While Latin American students' identity is discursively articulated around the use of Spanish as their mother tongue (L1), Maghribian students' attitudes derive from their instrumental perception of Spanish, together with the relatively low functional impact of Catalan on their everyday live in Catalonia.

It is evident that the results we have just offered derive from a generalization. This notwithstanding, we should not forget the heterogeneity (that we could also find in any other human group) inherent to the Latin American community. As we have already pointed out, a higher degree of social integration, along with a better perception of "the other" (from the perspective of both local and immigrant individuals) improves attitudes towards Catalan, which is in turn beneficial for language learning. Vila, Siqués, and Oller (2009) confirmed this relationship in their research on reception classes for immigrants in Catalonia. The knowledge of

[2]The success of linguistic immersion programs with native students runs parallel to higher rates of academic failure affecting immigrant students. In fact, international reports (i.e., PISA reports) have shown that in most countries the averages obtained in the different competences evaluated tend to be slightly lower among students of immigrant origin when compared to their native peers (Ministerio de Educación y Ciencia, 2007; Ministerio de Educación, 2010).

Catalan and the extent to which students integrate into schools are closely related, even more so if we consider that language becomes instrumental and acquires its full significance in social interaction. The transfer of abilities generated in an academic context can only consolidate if there exists a continuum of use between academic contexts and social use (Vila, Siqués, & Oller, 2009). This leads us to the difficulties that have arisen when trying to foster the use of Catalan among immigrant students (Galindo, 2008). Besides, these efforts tend to collide with the sociolinguistic characteristics of: 1) city areas agglutinating the vast majority of immigrant population, and 2) the resulting artificial concentrations in some schools, that are eventually avoided by native families (Carbonell, 2005).

When dealing with proposals that advocate for the implementation of immersion programs with immigrant students (particularly in the case of Latin American students), we should not obviate that such programs are coherent with Cummins' Linguistic Interdependence Hypothesis (Cummins, 1979). The Hypothesis puts forward the idea that the linguistic abilities developed in a given language (*Lx*) can be transferred onto any other one (*Ly*) under certain conditions: 1) enough and adequate exposure to *Ly*, either in or outside the school, and 2) motivation to learn *Ly*. As regards Catalan, for example, this would imply instruction in Catalan, which would help students develop reading and writing skills in that language. At the same time it would enable them to develop deeper conceptual and linguistic skills narrowly intertwined with their learning of Spanish, insofar as it is strongly present in society and is also object of instruction. This perspective would imply the existence of an underlying cognitive-academic proficiency, common to all languages (*Common Underlying Proficiency* - CUP), which facilitates transfer even if certain superficial elements of the language (such as pronunciation and fluency) remain unconnected. Accordingly, this general competence would not affect those elements commonly regarded as linguistic; rather, it points at general aspects governing general language use.

If we agree on the fact that language acquisition takes place in social interaction (Bruner, 1983; Wells, 1981), and also that there exist general rules governing language use which are not the sole patrimony of any single language, students may be able to improve their skills by progressing in their command of any given language. Consequently, when learners attend a school where the language of instruction is different from their L1, if provided with enough opportunities to improve their competence in the L2, apart from reaching this goal they will develop their general competence common to both languages. This will be the case if students are also able to use their L1 in social or familiar settings, as this will generate the environments necessary for the transfer of abilities (developed in L2, and vice versa) to take place. In other words, as far as language command is concerned, learning a language favors the development of other languages if they are fostered in all the contexts where they are present (Gass, 1996; Jarvis & Pavlenko, 2008).

Everything said so far applies to languages that are either close or distant in typological terms. In the first case, the transfer operates at both linguistic and conceptual levels, while in typologically distant languages transfer takes place affecting mainly cognitive and conceptual elements, as would be the case with English and Japanese (Cummins et al., 1984) or Spanish and Náhuatl (Francis, 2000)[3]. In fact, depending on the sociolinguistic situation, according to Cummins (2005) we are dealing with five different kinds of transfer of: conceptual elements, metacognitive and metalinguistic strategies, pragmatic aspects, specific linguistic elements and phonological awareness (that is, awareness of the fact that words are made up of different sounds and sound patterns).

Cummins' proposal has been related to modular approaches (Francis, 2002, 2004, 2008) which, in opposition to more holistic perspectives, stand for the existence of specialized mental structures in constant interaction and re-elaboration (Fodor, 1983). Hence we can approach reading as either a global process or, conversely, as consisting of a series of closely intertwined abilities related to phonological knowledge, phoneme-grapheme mechanisms, text processing, etc. The fact that a given individual may have developed certain skills in a language, but not others (non-native pronunciation but advanced narrative abilities, deep knowledge of the grammar of the language but limited lexicon), would confirm the modular structure of the mind (Francis, 2008). On the other hand, the transfer of knowledge in a given subject, be it taught in one language or another, would explicate the independence between conceptual and linguistic knowledge (MacSwan & Rolstad, 2005).

Whatever the case may be, we cannot develop here a whole review of the various works that have supported the Linguistic Interdependence Hypothesis. To that end we address the reader to Baker and Hornberger

[3]Francis (2000) has put forward an interesting modification of Cummins' "double iceberg" model (Cummins, 1984, 1996), linking it to typological closeness in the languages spoken by bilingual individuals. He thus stresses the extent to which experience in any language can promote the development in the common underlying competence. In the case of typologically close languages, the space shared would be enlarged thanks to the common phonological, lexical and phonological traits, apart from those general aspects shared by all languages. In any case, a Central Operational System would act as the organizer, coordinating all linguistic activity regardless of the specific language being used.

(2001) or to Cummins himself (1996, 2000, 2005, 2008). As regards Catalonia, the Hypothesis has been tested both with native (Huguet, Vila, & Llurda, 2000; Vila, 1995) and immigrant students (Huguet, 2008; Oller, 2008).

If we focus on these two last studies, it is worth commenting on the fact that the first one (Huguet, 2008) was carried out in a secondary education school, with 121 subjects in the sample (93 native and 28 immigrant students aged 14 to 16), and Romanian, Ukrainian, Bulgarian, Arabic, Spanish, Portuguese and Wolof as the L1s spoken by the students. After analyzing the data obtained in two parallel tests of linguistic competence in Catalan and Spanish, the work focuses on the explicative possibilities of the Hypothesis when it comes to pinpointing the mechanisms at work in the acquisition of new languages by immigrant students in multilingual settings. The analysis carried out seems to indicate that interdependence and linguistic transfer processes do take place, with certain linguistic abilities being more likely to be transferred than others. Precisely, those transferred are located at a deeper level of linguistic competence, in contrast to those found at more superficial levels.

Oller (2008) worked on a sample of 1,141 twelve-year-olds in their last year of primary education in different schools (626 native and 515 immigrant students). There were more than 30 L1s in the sample, and all students participated in Spanish and Catalan competence tests. Among others, the following dimensions were considered in the study: L1, length of stay in Catalonia, family educational level and socio-professional status, sociolinguistic context and rate of immigrant students per classroom. With the analysis of different linguistic skills, and also of the aforementioned variables, the author sought to clarify the establishment of relationships of linguistic interdependence. To that end, it was concluded that there was a direct correlation between knowledge of Catalan and of L1, as the majority of immigrant students had previously developed cognitive-academic abilities in their own languages. They could transfer these abilities to their Catalan competence if given the chance to use their L1s in their immediate social and academic context. Therefore, L1 was considered as an influential factor in the process of acquisition of the vehicular language, as it mediates in the establishment of relationships of interdependence in accordance with the sociolinguistic context and the different abilities involved.

Later analyses of the same data (Oller & Vila, 2011) focused on some linguistic groups of immigrant students in the sample: 221 speakers of Spanish, 44 speakers of Romanian and 131 speakers of Arabic. Drawing on a revision of previous research on learners of English-L2 in the USA (Genesee, Lindholm-Ready, Saunders, & Christian, 2005; 2006), it was established that Catalan-Spanish (and vice-versa) transfer and relationships of interdependence take place between Latin American students' L1 and L2. The same applies for L2 and L3 in Romanian or Arabic-speaking students in the sample. Nonetheless, such relationships affect more clearly cognitive-academic skills (linked to written language) than conversational abilities (deployed in oral interaction), all of them in turn framed by length of stay, mother tongue and the corresponding sociolinguist context. Specifically, Latin American students show a higher rate of transfer in writing and reading skills already developed in Spanish, while the process does not apply so clearly in oral abilities due to the lack of opportunities to use Catalan outside the school. Conversely, Romanian-speaking students live in contexts where Catalan is more socially present than Spanish, which helps them develop good levels of oral competence in the former language, which also benefits their reading and writing skills. Lastly, Arabic-speaking students obtain the lowest scores in Catalan and Spanish when compared to other groups[4]. This can be attributed to either differences in family educational level or to difficulties to use their L1 in formal-academic contexts, as they had spent most of their schooling in Catalonia, where they arrived by 2000. Romanian students, on the other hand, had arrived in the region later in their lives and had already been schooled in their country.

As a summary, the authors conclude by stating that in Catalonia (where Catalan is the vehicular language and Spanish is taught two hours per week)

> "additional knowledge of oral Catalan is needed so that, on one hand, recently arrived students can transfer the abilities they have already developed from their languages to Catalan and Spanish (and vice-versa). On the other hand, this will also help students of foreign origin born in Catalonia progress in those abilities linked to written Catalan and transfer them onto Spanish (or vice-versa)" (Oller & Vila, 2011: 19)[5].

[4]As might be expected from the previous discussion, Latin American students performed much better in Spanish, while Romanian students showed better results in the Catalan tests. This is consistent with previous research on Romanian-speaking students in Catalonia (Chireac, Serrat, & Huguet, 2011).

[5]In fact, the authors are coherent with their theoretical framework, both as regards the relevance of oral skill development in L2: "As in English-L1 literacy development, some minimum level of oral proficiency in English is necessary for English-L2 literacy development, and children with well-developed English-L2 oral skills achieve greater success in English reading than children with less well-developed skills" (Genesee et al., 2005: 370), as when they argue that writing and reading skills in L2 can improve even if students have limited competence in L2 but have developed it in certain domains of their L1: "… these findings from studies of L2 and L1 oral proficiency indicate that there are two routes to initial literacy in English-L2: one via skills that have been acquired in the target L2 and one via skills that are linked to the L1 in cases when ELLs (English Language Learners) lack well-developed L2 skills" (Genesee et al., 2005: 371).

Against this conceptual background, our research aims at analyzing how Catalan-Spanish (and Spanish-Catalan) interdependence and linguistic transfer processes take place, alongside linguistic ability development, in two groups. Although the groups (native Spanish-speaking students and Spanish-speaking Latin American students) share, a priori, the same language, we should not forget that we are dealing with different varieties of Spanish.

Method

Participants

The sample consists of 237 Spanish-speaking students (16 years of age) in their last year of Compulsory Secondary Education in Catalonia. Out of the overall sample, 123 were native students, while the rest (114) were immigrants coming basically from Latin American countries (see Table 1).

We should highlight that all students had previously been schooled either in their home countries or in Catalonia, and that those students who had spent less than three months in Catalonia were excluded from the Latin American group. Overall, the average time of stay in Catalonia was 4.67 years, with a standard deviation of 3.91 years. Taking mother tongue as a criterion (Castilian vs. Latin American Spanish varieties) the Latin American group was selected from a representative and larger sample of students of immigrant origin in Catalan schools. Native students were selected according to L1 (Spanish) in the same schools and academic level. Catalan speakers (L1) as well as bilingual Catalan-Spanish students were also excluded from the study.

Materials

Two tests designed and scaled by the Education Department of the Government of Catalonia were used to evaluate the linguistic abilities (in Catalan and Spanish) necessary to follow schooling in Catalonia. The test analyzed pre-established aspects of language, although a few sections were more open. The tests, parallel in their internal structure, analyze the following dimensions: Oral Comprehension (OC), Morphosyntax (MS), Orthography (ORT), Written Comprehension (WC), Written Expression (WE), Oral Expression Lexico-Morphosyntax (LMS), Oral Expression Information Organization (IO), Phonetics (PhO), Reading Correctness (R-C) and Reading Intonation (R-I). All sections are graded following a scale ranging from 0 to 100 points according to right and wrong answers. Lastly, two scores are obtained: SC1 and SC2. The first score is drawn from the average corresponding to the first five written subtests, carried out collectively. The second score corresponds to the average from all the tests (written and oral, the latter set being implemented individually).

To complete the test an accompanying booklet is required, and the subtests have to be completed in the amount of time allotted for each task. As we have already pointed out, the Catalan and Spanish tests are parallel (their internal structure is equivalent), but activities differ in each case in terms of content, texts, vocabulary, etc. Additionally, all participants answered a questionnaire in order to collect useful information that would let us control certain variables incorporated into the analysis: country of origin, home language, length of stay, etc.

Difficulty indexes, correlations and reliability were calculated by means of the "two halves" technique, widely described in Bel, Serra, and Vila (1991). The Pearson's correlation obtained to measure subtest reliability oscillated in all cases between $r = .61$ and $r = .80$.

Lastly, we would like to emphasize that the tests used for this study have already been implemented successfully both in the study of traditional bilingual contexts (Huguet et al., 2000; Huguet & González-Riaño, 2002), as well as in contexts of immigration (Huguet, 2008; Navarro & Huguet, 2010). Table 2 gives a summary of the tasks performed in each of the sections of the general tests.

Table 1. *Immigrant Spanish-speaking students according to country of origin*

	n = 114	%
Argentina	11	9.65
Bolivia	15	13.16
Chile	10	8.77
Colombia	15	13.16
Cuba	1	0.88
Dominican Republic	10	8.77
El Salvador	1	0.88
Ecuador	29	25.44
Equatorial Guinea	1	0.88
Honduras	3	2.63
Mexico	2	1.75
Peru	6	5.26
Uruguay	5	4.39
Venezuela	5	4.39

Procedure

After clarifying the aims of our study, local educational authorities suggested the most suitable schools for our work. Once the corresponding authorizations were issued meetings with the different school boards were arranged.

The tests were implemented in May, one month before the end of the school year, by different people specifically trained to carry out the different tasks. All students completed the collective part of the tests in their corresponding classrooms, while the individual

Table 2. *Tasks carried out in the Catalan and Spanish sub-tests*

WRITTEN PART - SUB TESTS				
Oral comprehension	**Morphosyntax**	**Orthography**	**Written comprehension**	**Written expression**
• Interpreting and identifying oral texts	• Plural formation	• Phonetic discrimination	• Interpreting directives	• Writing a text on a simple topic chosen by the student.
• Recognizing typologically diverse oral texts	• Verbal inflection	• Orthography	• Identifying basic information in a text	
• Recognizing figurative use of phrasal and idiomatic chunks	• Word replacement in sentences		• Deploying comprehension strategies	
• Oral text comprehension	• Identifying nouns, verbs and adjectives in sentences		• Identifying words in relation to their meaning	
ORAL PART - SUB TESTS				
Oral expression-LM	**Oral expression-OI**	**Phonetics**	**Reading Correctness**	**Reading Intonation**
• Producing simple oral messages	• Describing an image: structural narrative order and balance between parts, lexical precision, etc.	• Reproducing sounds	• Error analysis (reading)	• Error analysis (intonation)
• Producing words or simple sentences		• Reading appropriately		
		• Phonetic discrimination		

part was administered in an office where the interviewer met each student individually.

For the completion of the collective part of each test 75 minutes were required, distributed as follows: Oral Comprehension (15 minutes), Morphosyntax (20 minutes), Orthography (10 minutes), Written Comprehension (15 minutes) and Written Expression (15 minutes). The time employed in the completion of the individual test could vary, but the average oscillated between 15 and 30 minutes for each subject and language. For this reason, and given the lack of previous studies with Latin American students, while the collective tests were implemented with the overall sample, individual tests were applied to all Latin American students (n = 114) and to 20% of native students selected at random (n = 23).

Data analysis

Bearing in mind the quantitative nature of the data obtained, we have mainly used descriptive statistics, ANOVA, correlation techniques and simple regression analysis.

This kind of approach, apart from providing us with a correlation index between the scores corresponding to Catalan and Spanish, helped us define a hypothetical line that determines the relationship between both languages in terms of student performance in the tests. In all cases the statistical treatment was carried out using *Statview for Windows* (v 5.0.1). The significance level used was .05.

Results

According to the aims posed for the research, in what follows we present our results in two main blocks: a) as regards the description of linguistic knowledge in Catalan and Spanish in Spanish-speaking Latin American students in Compulsory Secondary Education (compared to their native Spanish-speaking peers); and b) with regard to the analysis of processes of Catalan-Spanish (and Spanish-Catalan) interdependence and transfer in both groups of students.

Linguistic knowledge (Catalan and Spanish): Latin American vs. native students

In order to compare linguistic knowledge in both languages, we applied a variance analysis that contrasted the results obtained by native and Latin American students in each of the Catalan and Spanish subtests, also concerning the global indexes SC1 and SC2. Table 3 shows this contrast in scores and its significance level.

As may be observed, both for Catalan and Spanish, in the collective written parts scores were notably lower among Spanish-speaking Latin American students for all subtests and indexes. Of course, this is expressed in the SC1 indexes for both languages: $F(1, 235) = 82.553$, $p < .0001$ for Catalan and $F(1, 235) = 35.882$, $p < .0001$ for Spanish.

The oral individual part, on the other hand, rendered very different results. Concerning Catalan, two of the subtests [Oral Expression Information Organization (IO) and Reading Intonation (R-I)] do not show significant differences between the groups. However, the fact that the written and oral subtests are considered when calculating SC2 brings about favorable values for native students, $F(1, 135) = 17.088$, $p < .0001$. As for Spanish, none of the oral subtests gave significant differences, which implies that they do not appear in SC2, either. In other words, if we refer to SC1 and SC2, taking the standard deviation of the native group as a reference, the average score obtained by Spanish-speaking students of immigrant origin is two standard deviations below in SC1, and one and a half standard deviations below in SC2 for Catalan. The distance is shortened to one standard deviation in the case of SC1 and up to one-half in SC2 for Spanish. This entails the absence of significant differences in this last index in the groups compared.

Lastly, the high value of the standard deviation in almost all subtests in the Latin American group should not be scoffed at when compared to the low values obtained by their native Spanish-speaking peers. Such differences must be interpreted considering that linguistic knowledge in the former group is characterized by its variability and heterogeneity, as opposed to higher homogeneity among native students.

Relationships of linguistic interdependence: Latin American vs. native students

The results of the simple regression analysis contrasting students' knowledge in Catalan and Spanish, according to both indexes (SC1 and SC2), are shown in Figures 1 and 2. The data for native and immigrant Spanish-speaking students are offered separately.

The previous graphs, apart from showing the correlation index between the scores corresponding to knowledge of Catalan and Spanish, also define a hypothetical line determining the relationship between each of the groups in terms of performance.

The final result consists of the correlation indexes $r = .720$, $p < .0001$ in SC1 and $r = .903$, $p < .0001$ in SC2 for Spanish-speaking native students, and $r = .754$, $p < .0001$ in SC1 and $r = .709$, $p < .0001$ in SC2 for Spanish-speaking students of immigrant origin. This shows the extent to which transfer of abilities and relationships of interdependence take place. Consonant with the data published by the Generalitat de Catalunya (2006),

Table 3. *Comparison of average scores and standard deviation for Catalan and Spanish (native vs. immigrant students). Sub-tests, global indexes (SC1 and SC2) and significance levels in all cases*

CATALAN	**Native**	***SD***	**Immigrants**	***SD***	***F* value**	***p***
OC	81.767	16.252	65.987	23.610	36,360	< .0001*
MS	76.163	14.724	46.127	24.975	129,396	< .0001*
ORT	84.400	16.839	68.529	23.008	37,095	< .0001*
WC	79.766	11.815	60.357	22.708	69,554	< .0001*
WE	86.780	17.262	71.579	29.201	24,211	< .0001*
SC1	*81.775*	*10.420*	*62.516*	*20.872*	*82,553*	*< .0001**
LMS	77.887	10.375	60.724	20.087	15,869	< .0001*
IO	53.333	19.280	48.399	24.497	0,828	= .3645
PhO	80.335	8.660	69.519	15.112	11,008	= .0012*
R-C	65.870	22.036	37.215	28.856	20,248	< .0001*
R-I	39.130	33.698	29.890	31.776	1,586	= .2100
SC2	*71.893*	*11.613*	*55.833*	*17.857*	*17,088*	*< .0001**
SPANISH	**Native**	***SD***	**Immigrants**	***SD***	***F* value**	***P* value**
OC	66.833	18.946	55.372	20.976	19,529	< .0001*
MS	87.960	10.200	73.975	20.053	46,775	< .0001*
ORT	87.662	10.769	80.502	16.607	15,731	< .0001*
WC	79.257	11.326	70.815	17.801	19,257	< .0001*
WE	82.520	11.491	73.877	21.993	14,678	= .0002*
SC1	*80.846*	*8.993*	*70.908*	*15.854*	*35,882*	*< .0001**
LMS	77.241	9.837	72.876	12.749	2,402	= .1235
IO	47.827	27.663	50.003	26.476	0,127	= .7217
PhO	75.470	14.718	67.751	18.084	3,689	= .0569
R-C	54.565	33.198	40.568	33.066	3,425	= .0664
R-I	28.130	27.682	40.535	33.975	2,699	= .1027
SC2	*67.172*	*12.438*	*62.627*	*15.315*	*1,785*	*= .1838*

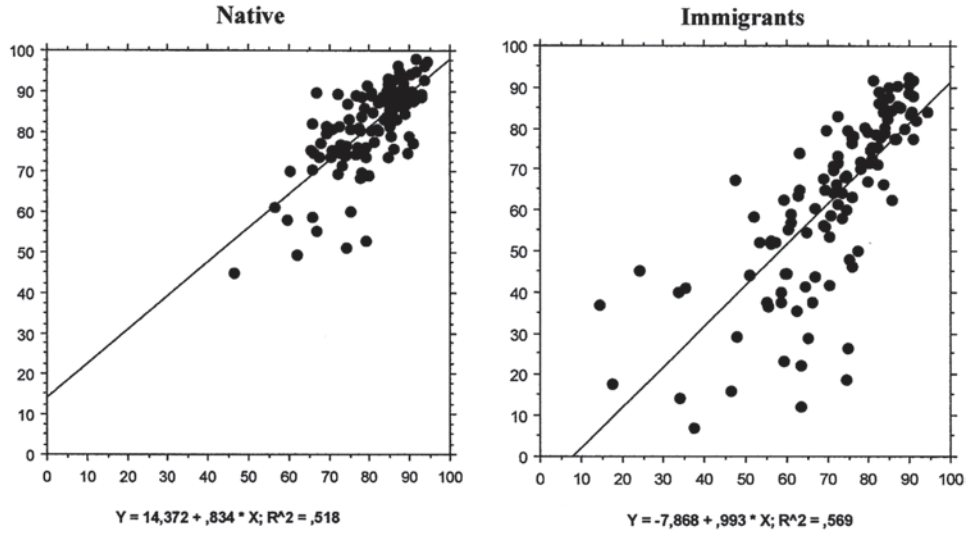

Figure 1. Regression lines corresponding to native and immigrant Spanish-speaking students (SC1 index).
Note: The abscissa axis (X) presents the values corresponding to Spanish; the ordinate axis (Y) shows the results for Catalan.

in the graphs to the left we may observe certain equilibrium in knowledge of both languages among native students. However, the slant and intercepts of the line show slightly higher command of Catalan over Spanish among native students; just the opposite results hold in the case of Spanish-speaking immigrants.

Although the relationship between Spanish and Catalan in native students has been broadly tested

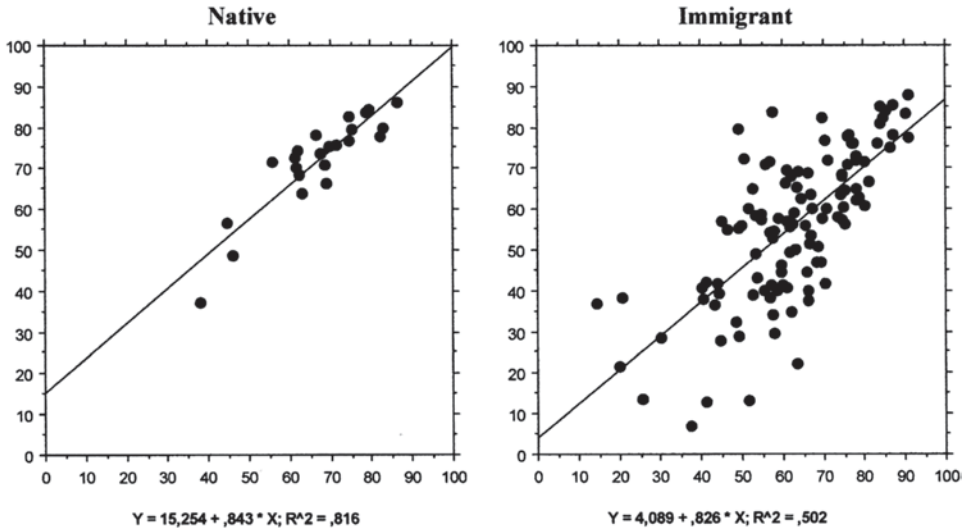

Figure 2. Regression lines corresponding to native and immigrant Spanish-speaking students (SC2 index).
Note: The abscissa axis (X) presents the values corresponding to Spanish; the ordinate axis (Y) shows the results for Catalan.

(Arnau, Bel, Serra, & Vila 1994; Huguet et al., 2000; Vila, 1995) there is not a similar tradition of research focusing on students of immigrant origin, even less so when dealing with Latin American students. In this sense, the contrast presented in the paragraph above shows how the results obtained in the native group place these students in the upper end of the hypothetical line, while in the immigrant group certain dispersion takes place.

Nevertheless, we should not lose sight of the fact that, as the high correlations obtained show, linguistic transfer and interdependence processes do take place uniformly in Spanish-speaking Latin American students. This last assertion has been corroborated when analyzing the correlation matrix corresponding to the different subtests making up the global test. As may be appreciated in Table 4, the correlation indexes for equivalent Catalan and Spanish subtests are rather high in most tasks, which results in positive significance levels in all cases. More specifically, Fisher's test showed the following values: OC (r = .626, p < .0001), MS (r = .651, p < .0001), ORT (r = .639, p < .0001), WC (r = .629, p < .0001), WE (r = .313, p = .0007), LMS (r = .432, p < .0001), IO (r = .330, p = .0003), PhO (r = .391, p< .0001), R-C (r = .404, p < .0001) and R-I (r = .419, p < .0001).

From the thorough observation of the previous table another relevant question comes to the surface. If we draw two Cartesian axes separating written and oral texts, we obtain four quadrants where we can identify (moving from one to four) the following interactions: 1) between written tests in Catalan and Spanish; 2) between oral Spanish and written Catalan

Table 4. *Correlation matrix corresponding to all sub-tests in Catalan (files) and Spanish (columns) in Spanish-speaking Latin American students*

	WRITTEN PART - SUB TESTS					ORAL PART - SUB TESTS				
	CO	MS	ORT	CE	EE	LMS	OI	FON	LE-C	LE-E
OC	.626	.639	.363	.480	.362	.355	.224	.220	.107*	.281
MS	.608	.651	.515	.587	.439	.422	.179*	.294	.235	.368
ORT	.566	.600	.639	.611	.564	.527	.203*	.473	.287	.358
WC	.609	.664	.420	.629	.470	.528	.167*	.311	.181*	.267
WE	.475	.440	.447	.377	.313	.397	.153*	.341	.281	.353
LMS	.608	.536	.357	.513	.434	.432	.129*	.329	.187*	.303
IO	.416	.505	.353	.429	.290	.365	.330	.366	.383	.395
PhO	.435	.439	.533	.428	.448	.458	.066*	.391	.169*	.163*
R-C	.246	.387	.429	.298	.418	.181*	.221	.245	.404	.364
R-I	.192*	.260	.293	.208*	.301	.150*	.207*	.291	.352	.419

*Non-significant correlations (p > .05).

texts, 3) between Spanish written and oral Catalan tests and 4) oral Catalan and Spanish tests.

After another reading of Table 4 we see that just 16 out of 100 correlations are not significant ($p > .05$), all of them located in those quadrants where oral tests appear (we do not find this type of interaction in the first quadrant). As we see, the data obtained seem to point at the fact that interdependence and language transfer relationships appear more intensely in written subtests than when oral tests are also considered.

Discussion

We would like to start by highlighting that we have, once more, been able to corroborate the extent to which instruction in a language other than the student's L1 does not necessarily have a negative influence on transfer processes inherent to the Linguistic Interdependence Hypothesis[6] (Cummins, 1979). This is the case of native Spanish-speaking students in Catalonia receiving instruction in Catalan (Arnau et al., 1994; Huguet et al., 2000; Vila, 1995). These results are backed by our research, as we have employed correlational techniques different from those traditionally used in similar studies.

In any case, the main interest of our work has to do with the results obtained by newly arrived Spanish-speaking Latin American students. We believe it is necessary to insist upon the fact that we have by no means tried to draw any judgment value as to the Spanish dialectal varieties spoken either in Spain or America. Yet, our test is evaluating that variety of Spanish spoken in Catalonia, which is where our test has been scaled. This is in accordance with the aims of our research, as it is necessary to clearly establish the level and nature of the linguistic abilities required to be successful in this given setting. Although the language varieties used by all students in the sample fall within the same umbrella term (Spanish), we are well aware that immigrant students have a background different to that of their native Spanish-speaking peers. Most probably, if Latin American students had been tested in some of their own language varieties the results would have been just the opposite.

Bearing this in mind, we have observed that linguistic interdependence and transfer take place in the case of both native and immigrant Spanish-speaking students (Cummins, 1979, 2005). Now then, despite evidence in the high correlations between the level of competence in Catalan and Spanish in the latter group, they are far from attaining native-like scores in Catalan. In this particular instance, this is reflected in standard deviations from one and a half to two points below, and also in the higher dispersion of scores. This lets us conclude that the level of Catalan in Latin American students is strongly heterogeneous, while it is far more homogeneous in the native group. Obviously, motivation and attitudes towards learning Catalan act as a catalyst in this case (Baker, 1992; Huguet, Lasagabaster, & Vila, 2008; Lapresta et al., 2010).

At any rate, studies mainly carried out in English-speaking countries (Cummins, 1996, 2000) show the extent to which the full development of competences in a new language is a long and complex process. As Cummins says:

> "Research studies since the early 1980s have shown that immigrant students can quickly acquire considerable fluency in the dominant language of the society when they are exposed to it in the environment and at school. However, despite this rapid growth in conversational fluency, it generally takes a minimum of about five years (and frequently much longer) for them to catch up to native-speakers in academic aspects of the language" (Cummins, 2000, pp. 34).

Taking up again the results of our study, beyond global data on the interaction between competences in the different languages, we have been able to observe that the positive relationship can also be detected in each of the equivalent sections making up the general tests. Even more so, according to the theoretical framework adopted (Cummins, 1979; 2005; 2008; Gass, 1996; Genesee et al., 2005; 2006; Jarvis & Pavlenko, 2008), we can infer that fundamental interdependence processes take place at a cognitive-conceptual level, beyond what is generally regarded as formal and linguistic in nature. We can reach this conclusion thanks to the differences established when contrasting the written tests in isolation (see the first quadrant in Table 4), and with the incorporation of oral tests[7] to the analysis (rest of quadrants in the same Table). The completion of the written tasks requires the implementation of conceptual elements governing general language use, alongside metacognitive and metalinguistic strategies. The oral tests, on the other hand, are more closely bound to superficial aspects such as pronunciation and fluency (see Table 2). Whatever

[6]As we know, bilingual students in many countries do not receive instruction in their L1, which has negative consequences for their general linguistic competence. Probably, the specificity of the language contact situation in Catalonia favors more positive results, partly due to a more pluralistic approach to bilingual educational policy.

[7]As we pointed out in the procedure section, all Latin American students in the sample ($n = 114$), and only 20% of native students ($n = 23$), took part in the oral tests. This does not affect the most relevant results obtained in our study: (i) the analysis carried out in Table 4 (including only immigrant students), and (ii) the regression line corresponding to the PG2 index for this group (Figure 2).

the case maybe, linguistic closeness between Catalan and Spanish also results in the articulation of many positive relationships in oral tests.

Our results are consistent with the Linguistic Interdependence Hypothesis, also in the case of Spanish-speaking Latin American students in Catalan schools. Nevertheless, we must point out that certain abilities seem to be more prone to transfer than others, which takes us to the need to foster research in this field. Future studies could incorporate larger samples, which might help us identify, among others, which elements from each *Lx* are relevant, and at which point, in the process of acquisition of *Ly*. Unquestionably, all this will result in better knowledge on the mechanisms of language acquisition and in more effective educational practices.

References

Alonso-Tapia J., & Simón C. (2012). Differences between immigrant and national students in motivational variables and classroom-motivational-climate perception. *The Spanish Journal of Psychology*, *15*, 61–74. http://dx.doi.org/10.5209/rev_SJOP.2012.v15.n1.37284

Arnau J., Bel A., Serra J. M., & Vila I. (1994). A comparative study of the knowledge of Catalan and Spanish among 8th-grade EGB schoolchildren in Catalonia. In C. Laurén (Ed.) *Evaluating European Immersion Programs. From Catalonia to Finland* (pp. 107–127).Vaasa, Finland: University of Vaasa.

Baker C. (1992). *Attitudes and language*. Clevedon, UK: Multilingual Matters.

Baker C., & Hornberger N. H. (2001). *An introductory reader to the writings of Jim Cummins*. Clevedon, UK: Multilingual Matters.

Bel A., Serra J. M., & Vila I. (1991). *El coneixement de llengua catalana i castellana en acabar l'ensenyament obligatori el 1990* [The knowledge of Catalan and Spanish languages at the end of the compulsory education in 1990] (Unpublished manuscript). Barcelona, Spain: Departament d'Ensenyament-SEDEC

Bruner J. (1983). *Child's talk*. New York, NY: Norton.

Carbonell F. (2005). *Educar en tiempos de incertidumbre: Equidad e interculturalidad en la escuela* [To educate in days of uncertainty: Equity and interculturality in the school]. Madrid, Spain: Ministerio de Educación y Ciencia - Editorial La Catarata.

Chireac S. M., Serrat E., & Huguet Á. (2011). Transferencia en la adquisición de segundas lenguas. Un estudio con alumnado rumano en un contexto bilingüe [Transfer in Second Language Acquisition. A study with Romanian Schoolchildren in a Bilingual Context]. *Revista de Psicodidáctica*, *16*, 267–289.

Cummins J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research*, *49*, 222–251.

Cummins J. (1984). *Bilingualism and special education: Issues in assessment and pedagogy*. Clevedon, UK: Multilingual Matters.

Cummins J. (1996). *Negotiating identities: Education for empowerment in a diverse society*. Los Angeles, CA: California Association for Bilingual Education.

Cummins J. (2000). *Language, power and pedagogy. Bilingual children in the crossfire*. Clevedon, UK: Multilingual Matters.

Cummins J. (2005). La hipótesis de interdependencia 25 años después. La investigación actual y sus implicaciones para la educación bilingüe [The interdependence hypothesis 25 years later: Current research and implications for bilingual education]. In D. Lasagabaster & J. M. Sierra (Eds.) *Multilingüismo y multiculturalismo en la escuela* [Multilingualism and multiculturalism in the school] (pp. 113–132). Barcelona, Spain: Horsori.

Cummins J. (2008). Teaching for transfer: Challenging the two solitudes assumption in bilingual education. In J. Cummins & N. H. Hornberger (Eds.) *Encyclopedia of Language and Education, 2nd Ed., Volume 5: Bilingual Education* (pp. 65–75). New York, NY: Springer.

Cummins J., Swain M., Nakajima K., Handscombe J., Green D., & Tran C. (1984). Linguistic interdependence among Japanese and Vietnamese immigrant students. In C. Rivera (Ed.) *Communicate competence approaches to language proficiency assessment: Research and application* (pp. 60–81). Clevedon, UK: Multilingual Matters.

Defensor del Pueblo (2003). *La escolarización del alumnado de origen inmigrante en España: Análisis descriptivo y estudio empírico* [The schooling of pupils of immigrant origin in Spain: Descriptive analysis and empirical study]. Madrid, Spain: Oficina del Defensor del Pueblo.

Departament d'Educació (2010). *Educació - Estadística. Curso 2009/2010* [Education - Statistics]. Barcelona, Spain: Generalitat de Catalunya. Retreived from http://www20.gencat.cat/docs/Educacio/Home/Departament/Estadistiques/Estadistiques_anuals/Curs_2009_2010/Estadistica_0910.pdf

Eurostat (2011). Foreign citizens made up 6.5% of the EU27 population in 2010. *News releases, 105*. Luxembourg, Luxembourg: Eurostat. Retreived from http://europa.eu/rapid/pressReleasesAction.do?reference=STAT/11/105&format=HTML&aged=1&language=EN&guiLanguage=es

Fodor J. (1983). *The modularity of mind*. Cambridge, MA: MIT Press

Francis N. (2000). The shared conceptual system and language processing in bilingual children: Findings from literacy assessment in Spanish and Náhualt. *Applied Linguistics*, *21*, 170–204. http://dx.doi.org/10.1093/applin/21.2.170

Francis N. (2002). Modular perspectives on bilingualism. *International Journal of Bilingual Education & Bilingualism*, *5*, 141–161. http://dx.doi.org/10.1080/13670050208667752

Francis N. (2004). The components of bilingual proficiency. *International Journal of Bilingualism*, *8*, 167–189. http://dx.doi.org/10.1177/13670069040080020401

Francis N. (2008). Modularity in bilingualism as an opportunity for cross-discipline discussion. In J. Cummins & N. H. Hornberger (Eds.), *Encyclopedia of Language and Education, 2nd Edition, Volume 5: Bilingual Education* (pp. 105–116). New York, NY: Springer.

Galindo M. (2008). *Les llengües en joc, el joc entre llengües. L´ús interpersonal del català entre els infants i joves de Catalunya* [The languages in a game, the game of languages. The interpersonal use of Catalan among children and young people in Catalonia]. Lleida, Spain: Pagès Editors.

Gass S. (1996). Second language acquisition and linguistic theory: The role of language transfer. In S. W. Ritchie & T. Bathia (Eds.) *Handbook of second language acquisition* (pp. 317–345). New York, NY: Academic Press.

Generalitat de Catalunya (2006). *El coneixement de les llengües a Catalunya* [The knowledge of the languages in Catalonia]. Barcelona, Spain: Departament d'Educació i Universitats.

Genesee F., Lindholm-Ready K., Saunders W., & Christian D. (2005). English language learners in U.S. schools: An overview of research findings. *Journal of Education for Students Placed at Risk*, *10*, 363–385.

Genesee F., Lindholm-Ready K., Saunders W., & Christian D. (Eds.) (2006). *Educating English language learners*. Cambridge, MA: Cambridge University Press.

Huguet Á. (2007). Minority languages and curriculum. The case of Spain. *Language, Culture & Curriculum*, *20*, 70–86. http://dx.doi.org/10.2167/lcc327.0

Huguet Á. (2008). Interdependencia lingüística y práctica educativa. Un estudio con escolares de origen inmigrante [Linguistic interdependence and educational practice: A study with schoolchildren]. *Infancia y Aprendizaje*, *31*, 283–301. http://dx.doi.org/10.1174/021037008785702901

Huguet Á., & González-Riaño X. A. (2002). Conocimiento lingüístico y rendimiento escolar. Implicaciones educativas en un contexto bilingüe [Linguistic knowledge and school performance. Educational implications in a bilingual context.]. *Infancia y Aprendizaje*, *25*, 53–68. http://dx.doi.org/10.1174/021037002753508520

Huguet Á., Janés J., & Chireac S. M. (2008). Mother tongue as a determining variable in language attitudes. The case of immigrant Latin American students in Spain. *Language and Intercultural Communication*, *8*, 246–260. http://dx.doi.org/10.1080/14708470802303082

Huguet Á., Lasagabaster D., & Vila I. (2008). Bilingual education in Spain: Present realities and future challenges. In J. Cummins & N. H. Hornberger (Eds.) *Encyclopedia of Language and Education, 2nd Edition, Volume 5: Bilingual Education* (pp. 225–235). New York, NY: Springer.

Huguet Á., Vila I., & Llurda E. (2000). Minority language education in unbalanced bilingual situations: A case for the Linguistic Interdependence Hypothesis. *Journal of Psycholinguistic Research*, *29*, 313–333. http://dx.doi.org/10.1023/A:1005152305793

Instituto Nacional de Estadística (2012). *Avance del Padrón Municipal a 1 de enero de 2012. Datos provisionales*. Notas de prensa [Municipal Census preview January 1st 2012. Provisional data. Press release]. Madrid, Spain: INE. Retreived from http://www.ine.es/prensa/np710.pdf

Jarvis S., & Pavlenko A. (2008). *Crosslinguistic influence in language and cognition*. New York, NY: Routledge.

Lapresta C., Huguet Á., & Janés J. (2010). Análisis discursivo de las actitudes lingüísticas de los escolares de origen inmigrante en Cataluña [Discursive analysis of the language attitudes of immigrant students in Catalonia]. *Revista de Educación*, *353*, 521–547.

MacSwan J., & Rolstad K. (2005). Modularity and the facilitation effect: Psychological mechanism of transfer in bilingual students'. *Hispanic Journal of Behavioral Sciences*, *27*, 224–243. http://dx.doi.org/10.1177/0739986305275173

Ministerio de Educación y Ciencia (2007). *PISA 2006. Programa para la evaluación internacional de alumnos de la OCDE. Informe español* [PISA 2006. Program for International Assessment of OECD Students. Spanish report]. Madrid, Spain: Instituto de Evaluación de la Secretaría General de Educación.

Ministerio de Educación (2010). *PISA 2009. Programa para la evaluación internacional de alumnos de la OCDE. Informe español* [PISA 2009. Program for International Assessment of OECD Students. Spanish report]. Madrid, Spain: Instituto de Evaluación de la Secretaría de Estado de Educación y Formación Profesional.

Ministerio de Educación (2011). *Datos y cifras. Curso escolar 2011/2012* [Data and figures. Academic year 2011/2012]. Madrid, Spain: Secretaría General Técnica. Retreived from: http://www.educacion.gob.es/horizontales/estadisticas/indicadores-publicaciones-sintesis/datos-cifras.html

Navarro J. L., & Huguet Á. (2010). Conocimiento del Catalan y Castellano por parte del alumnado inmigrante [The knowledge of Catalan and Spanish in migrant students]. *Revista de Educación*, *352*, 245–265.

Oller J. (2008). *El coneixement de llengua catalana i llengua castellana per part de l'alumnat estranger escolaritzat a l'educació primària de Catalunya: Factors explicatius i relacions d'interdependència lingüística* [The knowledge of Catalan and Spanish on the part of the foreign students in primary education in Catalonia: Explanatory factors and relations of linguistic interdependence]. (Unpublished Doctoral dissertation). Department of Psychology. Universitat de Girona, Spain.

Oller J., & Vila I. (2011). Interdependencia entre conocimiento de catalán y castellano y efectos de la lengua familiar en la adquisición de las lenguas escolares [Interdependence between knowledge of Catalan and Spanish and effects of the home language on school language acquisition]. *Cultura y Educación*, *23*, 3–22. http://dx.doi.org/10.1174/113564011794728588

Serra J. M. (2010). Escola, llengua i immigració a Catalunya. Algunes reflexions [School, language and immigration in Catalonia. Some reflections]. *Llengua, Societat i Comunicació*, *8*, 27–33.

Vertovec S. (2007). Super-diversity and its implications. *Ethnic and Racial Studies*, *30*, 1024–1054. http://dx.doi.org/10.1080/01419870701599465

Vila I. (1995). *El català i el castellà en el Sistema Educatiu de Catalunya* [Catalan and Spanish in the Educational System of Catalonia]. Barcelona, Spain: Horsori.

Vila I., Canal I., Mayans P., Perera S., Serra J. M., & Siqués C. (2009). Las aulas de acogida de la educación primaria de Cataluña el curso 2005–2006: Sus efectos sobre el conocimiento de catalán y la adaptación escolar [Language support classrooms in Primary Education in

Catalonia during academic year 2005–2006: Their effects on knowledge of Catalan language and school adaptation]. *Infancia y Aprendizaje*, *32*, 307–327. http://dx.doi.org/10.1174/021037009788964123

Vila I., Oller J., & Fresquet M. (2008). Una anàlisi comparativa del coneixement de català de l'alumnat castellanoparlant autòcton i l'alumnat hispà en finalitzar l'educació infantil a Catalunya [A comparative analysis about the knowledge of Catalan in Spanish speakers from Catalonia and Latin America at the end of pre-school education in Catalonia]. *Caplletra*, *45*, 203–228.

Vila I., Siqués C., & Oller J. (2009). Usos lingüístics de l'alumnat d'origen estranger a l'educació primària de Catalunya' [Linguisitic uses of foreign-born students in primary education in Catalonia]. *Zeitschrift für Katalanistik*, *22*, 95–124.

Wells G. (1981). *Learning through interaction*. Cambridge, MA: Cambridge University Press.