

UNIVERSITAT OBERTA
DE CATALUNYA

**RESULTS OF THE LANGUAGE
MODEL ADOPTED BY
SCHOOLS IN CATALONIA.**

THE EMPIRICAL EVIDENCE.

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PROLOGUE

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The journey towards the consolidation of Catalan schooling as we know it has been a long and arduous one. In the aftermath of the ban on the use of Catalan during Franco's regime and with the reinstatement of a degree of political autonomy, Catalonia brought in a series of changes and actions to standardise its language. Naturally, the introduction of Catalan in schools was a priority for widening the social use of Catalan. The renowned psycholinguist Miquel Siguan (1918-2010) introduced to Catalonia the school model based on language immersion. Based on his extensive knowledge of the experiences with French in Quebec, he advocated the education of pupils in the minority language as a valid model for guaranteeing its standardisation. While Siguan is remembered as the man behind the idea, Joaquim Arenas, member of the management team at the Catalan Education Department of the Catalan Government, the Generalitat de Catalunya, was responsible for its implementation. The journey began with Royal Decree 2092/1978, which reintroduced the study of Catalan as a compulsory subject, but the major boost came with the passage of the Language Standardisation Act (Law 7/1983). Passed by Parliament with just two dissenting votes, this legislation established Catalan as "the language of Catalonia and teaching at every educational level". From that point on, Catalan was able to gain ground in schools: the Language immersion Programme was first introduced in the 1983-1984 academic year in the state schools of cities such as Santa Coloma de Gramenet and Terrassa, which had large Spanish-speaking populations as a result of immigration from across Spain. With the strong support of the people - opponents of the model were few and far between - schooling in Catalan became the educational model for the whole of Catalonia after 1992-1993. Armed with enthusiasm and their own retraining efforts, the teachers gave their backing to a model that spread rapidly. The foundation stone had already been laid: a major step had been made towards standardisation.

Since its introduction and especially in recent times, the model has been the victim of strong criticisms and come under fire from what many have identified as Spanish nationalist sectors. Nonetheless, if we stop to look at the academic results and the social acceptance of the model, we can conclude that these attacks are based not on educational or social criteria but on purely political motives. This holds truer still when we learn that there are no studies or assessments placing the results of Catalan schools below those of Spain as a whole. The recent findings of the Programme for International Student Assessment (popularly known as the PISA tests) show that the academic level of our pupils is above the average for Spain. These values include knowledge of Spanish, which is greater in Catalan pupils than in certain monolingual Autonomous Communities where the teaching is entirely in Spanish.

In this paper, addressed to the non-specialised public, we use a scientific approach to reveal data to support the reflection and evaluation of a model of success applauded by the Council of Europe and other international agencies; one that, in addition, does not segregate pupils by language and guarantees social cohesion. We do this by asking the same leading specialists who participated in the conference "Llengua i Escola a Catalunya: Mites i realitats. Presentació dels treballs de recerca empírica més recents sobre el tema" (Language and Schooling in Catalonia: Fact and Fiction. Presentation of recent empirical research on the subject), held at the College of Journalists of Catalonia on 6 July 2011 and organised by the Linguamón-UOC Chair in Multilingualism and the Psychology and Educational Science Department of the UOC, to come up with the answers to the following questions:

1. "Do Spanish-speaking pupils finish their compulsory education with gaps in their schooling because they studied in a language - Catalan - that is not their own?"
2. "Do pupils in the Catalan educational system have gaps in their education in comparison to pupils in other places?"
3. "Do pupils finish their compulsory education with gaps in their knowledge of Spanish because they studied (mainly) in Catalan?"
4. "Do all (or many) Spanish-speaking pupils (and speakers of other languages) finish their compulsory education with (significant) gaps in their knowledge of Catalan if they do not study (mainly) in Catalan?"
5. "Do individuals who acquired a good command of two languages early on find it easier to learn another language than monolingual individuals?"
6. "Is there any evidence to show that people who acquired a good command of two languages early on have cognitive advantages over monolingual people?"

1. "Do Spanish-speaking pupils finish their compulsory education with gaps in their schooling because they studied in a language - Catalan - that is not their own?"

Ignasi Vila (University of Girona)

Table 1. Mathematical knowledge. Immersion and Non-immersion in Catalonia and Spain. Fourth Year of Primary Education. 1993-1994 academic year.

	Immersion	Non-Immersion	Spain
Numbers and operations	61.10	52.76	61.30
Measurements	63.39	59.29	60.80
Geometry	65.56	56.66	60.10
Data analysis	68.90	65.65	69.30
Algebra and functions	61.67	53.42	58.30
Conceptual understanding	60.44	57.23	60.80
Procedural knowledge	69.05	60.19	66.10
Problem-solving	60.98	49.89	57.30

Source: Serra (1997).

Serra (1997) assessed the mathematical knowledge of pupils in their fourth year of primary school with a diagnostic test used across Spain. The assessment was carried out on two groups of Spanish-speaking pupils with the same sociocultural level, one educated in Catalan (language immersion) and the other in Spanish. The participants of each group totalled 322 and 266 pupils, respectively. The study found that the mathematical knowledge of Spanish-speaking pupils educated in Catalan equalled and even surpassed that of their peers educated in Spanish in Catalonia and in the rest of Spain. Moreover, the Spanish-speaking pupils assessed in Catalonia had a low sociocultural level and this is clearly not the case of the average pupil in Spain.

Table 2. Results in science, mathematics and reading comprehension. PISA 2006. Spanish-speaking pupils in Catalonia and Spanish average.

	Sciences	Mathematics	Reading
Spanish-speaking pupils in Catalonia	481	475	469
Spanish average	488	480	461

Source: Ferrer, Valiente and Castel (2008).

For the Spanish-speaking pupils of Catalonia assessed in PISA 2006, the results for science and mathematics were slightly lower than the Spanish average but slightly higher for reading comprehension. However, the Spanish average cannot be equated to that of Spanish-speaking pupils, since the participants in the sample include Catalan, Galician and Basque speakers. Nonetheless, given the lack of data with which to separate the different linguistic groups, comparing the results of Spanish-speaking pupils in Catalonia with the average for Spain is the only means we have to come up with the answer to the first question.

The differences between the results obtained in the two samples are not significant, meaning that the results of Spanish-speaking pupils in Catalonia are the same as the Spanish average.

Table 3. Results in science, mathematics and reading comprehension. PISA 2009. Spanish-speaking pupils in Catalonia

	Sciences	Mathematics	Reading
Spanish-speaking pupils in Catalonia	489	480	491
Spanish average	488	483	481

Source: Ferrer, Castejón, Castel and Zancajo (2011).

The data from PISA 2009 confirm that Spanish-speaking pupils in Catalonia are at the Spanish average. The 2009 study allows us to make a more accurate comparison of the results of Spanish-speaking pupils in Catalonia with those of other Spanish-speaking pupils from the regions that participated in the study. The analysis shows that, after allowing for the influence of the sociocultural level of families on the results of Spanish-speaking pupils overall, there are no significant differences between the results of Spanish-speakers in Catalonia and the majority of Spanish-speaking pupils in the rest of Spain.

Table 4. Results in science, mathematics and reading comprehension. PISA 2009. Spanish-speaking pupils in Catalonia and the other Autonomous Communities

	Sciences	Mathematics	Reading
Catalonia	503	493	500
La Rioja	520	518	511
Castile and Leon	520	523	511
Madrid	511	499	507
Navarre	519	521	506
Aragon	516	517	504
Galicia	525	506	503
Basque Country	499	513	502
Asturias	511	505	501
Cantabria	511	504	499
Murcia	497	493	495
Andalusia	492	488	482
Canary Islands	470	450	467
Balearic Islands	463	466	462
Ceuta and Melilla	446	441	439

Source: Ferrer, Castejón, Castel and Zancajo (2011).

Differences above 15 points are significant. For example, in science, Spanish-speaking pupils in Catalonia know significantly less than their peers in La Rioja, Castile and Leon, Navarre and Galicia, but significantly more than Spanish-speaking pupils in the Canary Islands and Ceuta and Melilla and as much as those in the other Autonomous Communities. In reading comprehension, Spanish-speaking pupils in Catalonia obtain significantly higher results than pupils in Andalusia, the Canary Islands and Ceuta and Melilla and the same as pupils in the other Autonomous Communities. In mathematics, the knowledge of Spanish-speaking pupils in Catalonia is significantly less than that of pupils in La Rioja, Castile and León, Navarre, Aragon and the Basque Country, significantly above that of pupils in the Canary Islands and Ceuta and Melilla, and on a par with that of pupils from the other Autonomous Communities.

It would appear that these differences in results are related not to the language used in school but to other variables affecting educational practice and school organisation. Comparing the results of Spanish-speaking pupils in Catalonia with pupils from the Madrid region in the tests evaluated is a good illustration of this.

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2. "Do pupils in the Catalan educational system have gaps in their education in comparison to pupils in other contexts?"

Joaquim Arnau (Department of Developmental Psychology and Education,
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Introduction

Assessments of the academic results of pupils who learn in multilingual contexts (some of whom do so in L1 and others in L2) have taken into account both language skills and the academic knowledge of the pupils. The latter relate to subjects that are not specifically linguistic (mathematics, science, etc.).

In both cases, the assessments have used criteria of internal comparison between pupils from the same context, and of external comparison with pupils from other contexts. Immersion programmes are based on internal comparison criteria: they compare pupils learning under this model (learning in L2) with pupils from the same linguistic group that do not follow this model (learning in L1). Assessments based on external comparison criteria refer to tests taken by pupils from several countries (such as the international PISA assessments). Based on this data, we can determine whether there are any differences between countries. The PISA reports have been used, for example, to compare the academic knowledge of pupils in Catalonia with those from other countries and with Spain as a whole.

To answer the question posed in the title of this report, we will analyse and compare data on the assessments of the academic knowledge of pupils following the immersion programme, comparative data on international assessments (PISA), and others.

The assessment of the academic knowledge of pupils following the Catalan immersion programme

These programmes have been evaluated by comparing the academic knowledge (mathematics, science) of Spanish-speaking pupils on the programme with Spanish-speaking pupils who have followed a programme taught mainly in their own language. The assessments are cross-sectional, that is, they compare pupils in a given school year.

The first assessments were based on small samples and made very early on in the programme, just when it was being introduced in our context. The results were contradictory. Some studies showed no significant differences between pupils following the programme and those that did not (Arnau 1985; Serra 1989). Others found inferior results only in certain areas of mathematics (Boixaderas *et al.* 1992; Ribes 1993). They were based on non-standardised tests and, in some cases, the assessment was made in the early stages of the programme. One possible explanation was that schools could have placed a different emphasis on certain aspects of mathematical knowledge.

The most comprehensive study on academic performance in mathematics was conducted by Serra (1997) on the basis of a standardised test "*Learning Mathematics*", conducted on a large sample of nine-year-old pupils from 20 different countries, including Spain. The test contains eight subject areas: Numbers

and operations, Measurement, Geometry, Data analysis, Statistics and probability, Algebra and functions, Conceptual understanding, Procedural knowledge and Problem solving. The results of the test, sat by a varied sample of fourth-year primary-school pupils with a low sociocultural level, comparing those on the immersion programme with those who were not, are as follows:

Table 1. Comparisons of averages in tests on mathematical knowledge according to the educational treatment variable (analysis of variance, ANOVA)

	IMMERSION		NON-IMMERSION		Significance of difference F	
	Average	Standard deviation	Average	Standard deviation		
Numbers	61.10	19.65	52.76	20.57	F = 16.636	p < 0.0001
Measurements	63.39	19.00	59.29	21.30	F = 3.916	p < 0.0486
Geometry	65.56	21.56	56.66	22.47	F = 15.807	p < 0.0001
Data analysis	68.90	23.16	65.65	25.32	F = 1.738	p < 0.1882
Algebra	61.67	24.02	53.42	23.97	F = 11.44	p < 0.0008
Concepts	60.44	17.26	57.23	18.57	F = 3.107	p < 0.0787
Procedures	69.05	20.22	60.19	21.77	F = 17.244	p < 0.0001
Problems	60.98	20.53	48.89	21.69	F = 26.68	p < 0.0001

Source: Serra (1997)

Pupils in the immersion programme obtained significantly higher scores than their peers following programmes in Spanish for the sections on Numbers and operations, Measurement, Geometry and Algebra and functions, and in the mathematical processes of Procedural knowledge and Problem solving.

The data presented are highly reliable and valid if we consider the quality of the test, the accuracy of the definition and assessment of all variables affecting the results, and the sociocultural level of the pupils.

Assessments of academic knowledge based on comparative data between countries.

The aim of the PISA (Programme for International Student Assessment) tests held in the framework of the OECD (Organization for Economic Cooperation and Development) is to develop indicators of the degree to which the various participating countries have prepared their fifteen-year-olds to develop constructive roles as citizens in society.

Catalonia participates in the development of these indicators, through the Consell Superior d'Avaluació del Sistema Educatiu (Higher Council for Evaluation of the Education System), by means of an agreement signed by the OECD and the Catalan Department for Education.

The PISA assessments are based on tests that require pupils to solve real-life situations, the results of which provide three types of indicator: "basic indicators" (baseline profile of student knowledge and competencies), "contextual indicators" (showing how these skills relate to important social, economic and educational variables) and "trend indicators" (showing the changes that occur in the results over time).

Catalonia has participated in successive PISA assessments (2000, 2003, 2006 and 2009) testing reading comprehension, mathematical competence and scientific skills. The last assessment was held with 15-year-old secondary-school pupils and compared the data from thirty-five OECD countries (Consell Superior d'Avaluació del Sistema Educatiu, 2010).

Table 2. Reading comprehension. Comparative position between countries

	Average	Position
Korea	539	1
Catalonia	498	15
OECD	493	23
Spain	481	28

Source: Consell Superior d'Avaluació del Sistema Educatiu (2010). Author's own work. Score range: 556 China-334 Kyrgyz Republic

Reading comprehension, as assessed by PISA, is an important part of academic achievement because it requires understanding, using and reflecting on written texts for the purpose of achieving one's own aims, developing knowledge and personal potential, and participating in society. It is not merely a dimension of language proficiency; it is a necessary competence for learning all academic contents, since they are all based on written texts that require interpretation.

In reading comprehension, Catalonia is in an intermediate position, above the OECD average; and well above the average for Spain, which has a significant percentage of the monolingual population following monolingual programmes in Spanish.

Table 3. Mathematical competence. Comparison by countries

	Average	Position
Korea	546	1
Catalonia	496	19
OECD	488	26
Spain	485	30

Source: Consell Superior d'Avaluació del Sistema Educatiu (2010). Author's own calculations. Score range: 575 China-330 Kyrgyz Republic.

Again, in mathematical competence, Catalonia is close to an intermediate position, above the OECD average and well above that of Spain.

Table 4. Scientific skills. Comparison by countries

	Average	Position
Finland	554	1
OECD	501	18
Catalonia	497	23
Spain	488	31

Source: Consell Superior d'Avaluació del Sistema Educatiu (2010). Author's own calculations. Score range: 600 China-331 Kyrgyz Republic.

The results for scientific skills are comparatively as good. They are slightly below the OECD average but, as before, above that of Spain.

Lastly, the 2010 *Evaluación General del Diagnóstico* (General Diagnosis Assessment) carried out by the Spanish Ministry of Education (2011) with second-year pupils at secondary schools in every Autonomous Community concluded that, in "mathematical competence" and "knowledge and interaction with the physical environment" (scientific skills), there are significant differences between the average scores of the Autonomous Communities.

Conclusions

None of the data analysed provide any evidence to suggest that schoolchildren in Catalonia have gaps in their academic knowledge because they follow a programme taught in Catalan (and for many, a programme in L2).

By contrast, there is some evidence to the contrary: their academic knowledge may even be greater. The most valid and reliable internal comparison of immersion programmes on mathematical competence would appear to suggest just that. The PISA assessments confirm that the academic performance of pupils in Catalonia is better than that of Spain as a whole, where the majority of pupils follow a monolingual programme in their L1.

The differences between results may be due, in some cases, to the different nature of the tests. Although we cannot confirm that a series of good results from pupils following the Catalan model are due to the excellence of the programme, the evidence presented here is more than sufficient to affirm that "*pupils in the Catalan educational system do not have gaps in their knowledge because they follow a programme in which Catalan is the main teaching language*".

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3. "Do pupils finish their compulsory education with gaps in their knowledge of Spanish because they studied (mainly) in Catalan?"

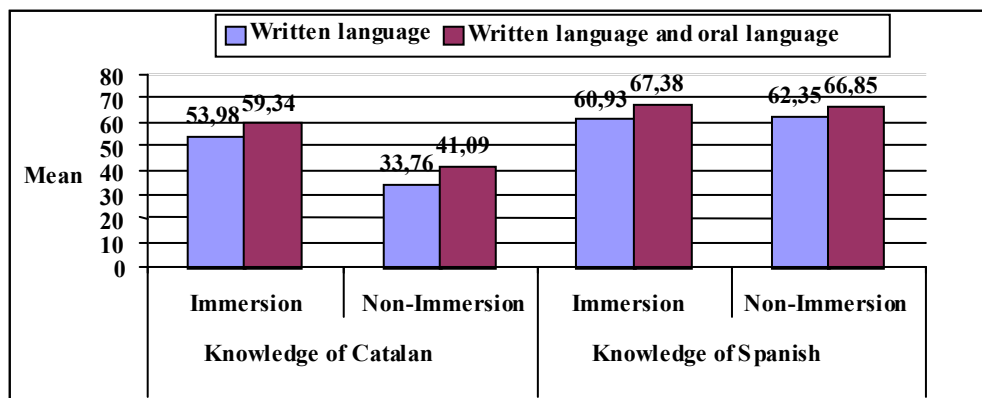
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The data recorded by various studies and the findings published by the Instituto de Evaluación (Spanish Assessment Institute, formerly the Instituto Nacional de Evaluación y Calidad del Sistema Educativo, INECSE), which reports to the Ministry of Education, and the Consell Superior d'Avaluació del Sistema Educatiu (Higher Council for Evaluation of the Education System, CSd'A), reporting to the Government of Catalonia, indicate that the knowledge of Spanish in Catalonia is comparable and in some cases, greater than the knowledge of Spanish of pupils in Spain overall. Note, however, that official assessments tend to assess basic language skills. Hence, we will refer to studies that have only assessed knowledge of Spanish, although we will also mention findings on competencies in order to compare performance with other Autonomous Communities. We will distinguish between the two stages of compulsory education - primary and secondary - in chronological order.

Knowledge of Spanish and language skills in primary education

During the 1993-1994 academic year, Serra assessed the knowledge of Catalan and Spanish in 396 pupils in their fourth year of primary school. The pupils were Spanish-speakers and came from families with a low sociocultural level. Half the pupils were taught in Spanish and learnt Catalan as a subject, while the other half followed an immersion programme (cited in Vila *et al.*, 2006: 79). Figure 1 summarises the results for Catalan and Spanish knowledge according to the language programme.

Graph 1. Knowledge of Catalan and Spanish according to language programme



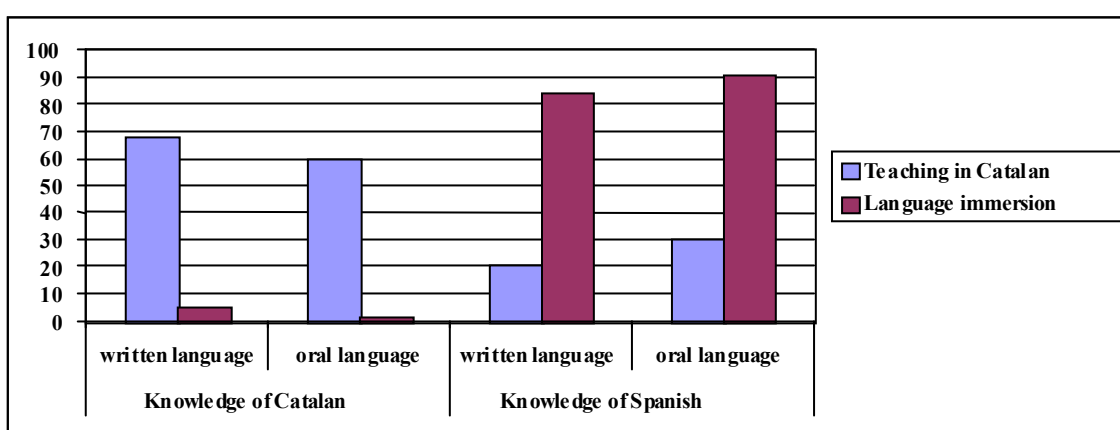
Source: Serra (1997) cited in Vila *et al.* (2006: 79)

The right-hand columns of Figure 1 indicate average knowledge of Spanish, while those on the left indicate knowledge of Catalan. For both, a distinction is made between the level of written knowledge and the level of oral and written knowledge according to the type of programme. We can see that the pupils who follow immersion programmes obtain the best results in Spanish in terms of knowledge of the written and spoken language (67.38); they even obtain better results in Spanish than those who do not follow immersion programmes (66.85). However, we also see that the knowledge of Catalan among immersion pupils is

much lower (59.34) than their knowledge of Spanish (67.38). In other words, although the language of instruction is Catalan, the pupils' knowledge of Spanish is greater.

During 1998-99 and 1999-2000, Canal and Vial (2005, cited in Vila *et al.*, 2006: 48) assessed the knowledge of Catalan and Spanish in fourth-year pupils of primary schools. The study included 132 schools across Catalonia, classified into three categories: 1) teaching in Catalan when the language used at home was Catalan for more than 30% of the pupils; 2) language immersion when the language used at home was Catalan for less than 30% of the pupils, and 3) schools where both Catalan and Spanish were the teaching languages. Figure 2 shows the results for knowledge of written and spoken Catalan and Spanish, comparing the first two types of school.

Graph 2. Knowledge of Catalan and Spanish according to type of school



Source: Canal and Vial (2005) cited in Vila *et al.* (2006: 48). Own estimates

Graph 2 shows that pupils undergoing language immersion have considerably better written and oral skills in Spanish than in Catalan. The trend indicated in the study cited above is therefore repeated. Shortly afterwards, in 2003, INECSE assessed, *inter alia*, knowledge of Spanish at the end of primary education (sixth year). Table 1 compares the average scores (as percentages of correct answers) of Catalan pupils with the averages of pupils in Spain.

Table 1. Average percentages of correct answers in Spanish language in the sixth year of primary education in 2003

	Catalonia	Spain
Listening	57	59
Reading	63	63
Written expression	71	71
Total	65	65

Source: Consell Superior d'Avaluació del Sistema Educatiu (2006): 19

The data in Table 1 show that, at the end of their primary education, knowledge of Spanish among Catalan pupils is comparable to the overall level across Spain for the same age. Lastly, in relation to linguistic communication skills in the fourth year of primary school, the results of the 2009 Evaluación General de Diagnóstico show that Catalan pupils obtain a slightly higher average score (502) than Spanish pupils (500) (Instituto de Evaluación, 2010a: 198).

Knowledge of Spanish and language skills in secondary education

Table 2 presents the data for the 2000 assessment of Spanish knowledge in fourth-year secondary-school pupils, with very similar results.

Table 2. Percentage of correct answers in Spanish in the fourth year of secondary school

	Catalonia	Spain
Oral and written comprehension	72	69
Written expression	58	58
Language as an object of knowledge	56	59

Source: *Consell Superior d'Avaluació del Sistema Educatiu (2006): 28-29*

The assessment of basic skills carried out by CSd'A during the 2001-2002 and 2003-2004 courses can be used to compare the results in Catalan and Spanish language for second-year secondary-school pupils, some of which are presented in Table 3.

Table 3. Percentage of correct answers in Catalan and Spanish, 2001-2002 and 2003-2004

		Catalan		Spanish	
		2001-02	2003-04	2001-02	2003-04
Understanding and interpretation	- oral texts	63	—	79	—
	- written texts	71	65	65	64
Spoken production	- speech	66	62	—	65
	- correction	65	88	—	87
Reading comprehension		—	89	93	—
Written production	- speech	63	43	66	72
	- correction	50	63	68	74

Source: *Consell Superior d'Avaluació del Sistema Educatiu (2006): 18, 32*

In relation to Table 3, note that some data have not been published and that the differences could be due to the written texts chosen. In any event, however, it shows that the results for the two languages are comparable overall.

Lastly, Table 4 summarises the reading comprehension results of the PISA tests in 2003, 2006 and 2009 for the fourth year of secondary school and the results of the 2010 EGD for linguistic communication in the second year of secondary school. The data in Table 4 indicate that, for all assessments, the performance of Catalan pupils is higher than the overall performance of Spain, although in some cases it is lower than the OECD average.

Table 4. Results of assessments

	PISA 2003 [*]	PISA 2006 [*]	PISA 2009 [*]	EGD 2010 ^{**}
Catalonia	483	477	498	502
Spain	481	461	481	500
OECD average	494	492	493	—

^{*}Reading comprehension results ^{**}Linguistic communication results

Sources: *Instituto de Evaluación 2010b: 154, 166 and 2011: 235; Consell Superior d'Avaluació del Sistema Educatiu (2006: 16; 2007: 70; 2011: 14)*

Taken as a whole, then, these data indicate that Catalan children and youths do not know less Spanish because they are taught in Catalan. Moreover, they know as much or more Spanish than the children and young people of Spain as a whole. We can therefore emphatically state that the results support the language immersion model.

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4. "Do all (or many) Spanish-speaking pupils (and speakers of other languages) finish their compulsory education with (significant) gaps in their knowledge of Catalan if they do not study (mainly) in Catalan?"

Ignasi Vila (University of Girona)

Table 1. Knowledge of Catalan. Non-immersion and immersion in Catalonia. Fourth Year of Primary Education. 1993-1994 academic year.

	Knowledge of Catalan			
	Immersion		Non-immersion	
	X	s.d.	X	s.d.
Written language	53.98	14.92	33.76	18.48
Oral and written language	59.34	9.98	41.09	14.02

Source: Serra (1997).

X: average, sd: standard deviation.

Serra (1997) evaluated Catalan knowledge among fourth-year primary school pupils using a diagnostic test developed in accordance with the criteria of the tests designed by the Department for Education of the Generalitat de Catalunya (Bel, Páramo, Serra and Vila, 1990). The assessment used two groups of Spanish-speaking pupils of the same sociocultural level, one taught in Catalan (language immersion) and the other in Spanish. The groups had 322 and 266 pupils respectively. The results show that Spanish-speaking pupils taught as part of a Catalan immersion programme know significantly ($p < 0.001$) more Catalan than Spanish-speaking pupils taught in Spanish. Furthermore, the knowledge of Catalan among pupils in the immersion group is more uniform than that of the group taught in Spanish.

Table 2. Basic competencies in Spanish and Catalan. Second year of secondary school. Years 2002 and 2004

		2002		2004	
		Catalan	Spanish	Catalan	Spanish
Understanding and interpreting information in a written text relating to the function and type of text, the information it contains and the pupil's own knowledge.		63	65	65	64
Expressing oneself orally by adapting to the communicative situation and the recipient in an orderly, clear and fluent manner and correctly applying one's linguistic knowledge of vocabulary and morpho-syntactic structures (a is discourse and b is correction).	a	71	Not assessed	62	65
	b	66	Not assessed	88	87
Read a text aloud in a comprehensive, expressive and fluent manner, with the correct intonation and pronunciation.		65	93	89	Not assessed
Produce a written text adapted to the	a	63	66	43	72

communicative need and the recipient in an orderly, clear manner and in sufficient detail, correctly applying one's linguistic knowledge of vocabulary, spelling and morpho-syntactic structures (a is discourse and b is correction).	b	50	68	63	74
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Source: Author's own work based on data obtained from the Consell Superior d'Avaluació del Sistema Educatiu (2004, 2005).

The data on knowledge of Catalan and Spanish in second-year secondary-school pupils during 2002 and 2004 show that pupils had an equal knowledge of Catalan and Spanish (see data for 2004) in terms of the competencies related to comprehension and oral expression but know more Spanish than Catalan in competencies related to written expression. If the teaching were not in Catalan, it would seem obvious that the results would be far more biased towards Spanish.

Table 3. Variables in the equation of knowledge of written Catalan of foreign-born pupils in Catalonia. Sixth year of primary school. Year 2007

	<i>B</i>	β	<i>P</i> <	Tolerance
Constant	22.396		.001	
Oral expression in Catalan	10.568	.254	.004	.781
Sociolinguistic environment	17.909	.447	.001	.781
Oral expression in Spanish	8.467	.208	.008	.938
Educational level of mother	9.811	.246	.003	.916
Sex	7.386	.185	.015	.964
Participation in classes for the reception of foreign-born nationals	-7.335	-.167	.034	.884

Source: Oller and Vila (2011).

Oller and Vila (2011) assessed 97 foreign-born children in the sixth year of their primary education at 31 schools in Catalonia, over 15% of whose pupils were foreign-born. The above table lists the variables revealed as significant in a multivariate linear regression with respect to knowledge of written Catalan. Clearly, the most important variable is the sociolinguistic environment ($\beta=0.447$) in the sense that the more "Catalanised" this is, the better the results are. Indeed, this variable is actually more important than the educational level of the mother ($\beta=0.246$), which is usually one of the most important variables in all studies on the academic performance of pupils. In other words, the Catalan knowledge of foreign-born pupils depends strongly on their contact with Catalan. So much so, that if they were educated in Spanish, their results in Catalan would be very poor.

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5. "Do individuals who acquired a good command of two languages early on find it easier to learn another language than monolingual individuals?"

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Being Bilingual

Having moved on from those times in the past when bilingualism was regarded more as a handicap than a benefit, many researchers and language professionals today argue, backed by solid foundations, that knowing more than one language, often from childhood, offers more advantages than disadvantages.

At a social level, discovering new communities and their respective cultures and languages, in addition to one's own, clearly promotes tolerance towards others. Children and bilingual individuals, given that they are exposed early on to cultural and linguistic diversity, quickly come to realise that others may have a different perspective to theirs. This puts them in a unique position for developing a more inclusive democratic spirit. And let us not forget that with bilingual individuals, society has citizens with two languages, which can have enormous positive effects both on social cohesion and on business and economic development, an issue often overlooked (see the ELAN report on Catalonia).

From a strictly linguistic perspective, this set of social and cognitive benefits promotes an easier and more efficient acquisition of new languages (Larsen-Freeman, 1983). We could say that, in a sense, being bilingual "prepares" an individual for learning a third language, since bilingual people have more flexibility for producing sounds of new languages due to the fact that they have a dual phonetic system. Moreover, as they developed a clear metalinguistic conscience early on, bilingual people are more sensitive when it comes to distinguishing between correct and incorrect constructions in other languages, understanding the arbitrary relationship between words and objects in different languages and, ultimately, thinking about language in general.

The two ideas that stand out from what we have mentioned above are:

Bilingualism brings two kinds of benefit:

- direct, in that it gives us a new language,
- and indirect, in that it prepares us for learning a third language.

Bilingualism and third language acquisition

This section will focus on the linguistic benefits of being bilingual compared to monolingual, particularly as children, and we will do so by illustrating a series of claims derived from the findings presented by a selection of research works.

Additive bilingualism can assist in overcoming the recognised influence of socioeconomic and cultural level on the development of academic, language and non-language skills.

In a study conducted in Canada (Swain & Lapkin 1991) in an English/French bilingual school context in Toronto, the acquisition of French as a third language

was examined in 300 thirteen-year-old foreign-born pupils of diverse geographical and linguistic origins. Their first language (L1) was the language spoken at home, their second language (L2) was English, and they learnt French as a third language (L3) in the bilingual school context: between the ages of 6 to 8, they were taught French as an L3 and from age 9 to 13, they followed a 50/50 bilingual English/French programme. English-speaking pupils for whom French was their second language (L2) also participated. The researchers organised the pupils into different groups: in the first, the monolingual English speakers and, in the second, the foreign-born pupils according to whether they had been taught in their first language and used it to write in.

The group that obtained significantly better results in oral and written competence in French (L3) was the one that, besides English (L2), had developed writing skills in their L1, regardless of whether or not the language they spoke at home was a Romance language. Therefore, the bilingual pupils who were literate in two languages - English and their own - acquired a better knowledge of French as an L3. Suffice to say that one of the most important findings of the study is that this group obtained better results than the monolingual English speakers, even though the latter had a higher socioeconomic and cultural level, a factor known to generally have a decisive influence on academic, linguistic and non-linguistic results. These results support the linguistic interdependence hypothesis as developed by Cummins (1979), whereby pupils, on acquiring a new language, benefit from the language skills they have already acquired in other languages (L1, L2, etc.), which they can positively transfer to new languages (L2, L3, etc.).

The higher the degree of bilingualism, the better the results in the third language (L3) are.

Cenoz (1991) studied the acquisition of English as an L3 by 321 pupils completing their secondary education (17/18-year-olds) in the Basque educational system, which is characterised by the presence of two languages: Basque and Spanish (first or second language of the pupils, as applicable); there were also bilingual families. Among other factors, such as the age at which the pupils began to learn English, the number of teaching hours, etc., the study sought to determine how being bilingual influences the acquisition of English as an L3. The results showed that the degree of bilingualism does indeed have a positive and significant influence on every language dimension analysed: oral and written comprehension, oral and written expression, grammar and vocabulary in English L3; in other words, the better their knowledge of Basque and Spanish, the better their knowledge of the foreign language.

Later, in the same academic context, Lasagabaster (2000) analysed 252 pupils aged 11-12 and 13-14 years following two different language models in the Basque educational system. This time, the results showed that pupils of model D (Basque immersion, which ensures bilingual competence in Basque and Spanish) obtained significantly better results in English L3 than those of model A, the programme in which Spanish is the teaching language with a single hour a day of Basque language and no guarantee of a "balanced" bilingualism in the two languages. Once again, bilingualism appears to function as a predictor of the relative success in mastering a third language.

The biliteracy of bilingual learners who speak and, above all, read in Catalan and Spanish is a key factor in improving the acquisition of English as an L3.

Two investigations conducted in Catalonia by the Adquisició de Llengües des de la Catalunya Multilingüe language acquisition research group (Acquisition of Languages from Multilingual Catalonia, ALLENCAM) focused on this issue. Sanz (2008) collected data on the acquisition of English as an L3 by 120 bilingual Catalan/Spanish adolescent learners (61 boys and 59 girls) at a school in the centre of Barcelona City. The author defines the school immersion programmes in Catalonia as "programmes [that are intended to] form bilingual pupils with balanced biliteracy and a greater mastery of the two languages, which they often use as is required by the sociolinguistic context in which they live." (Sanz, 2008: 224).

The purpose of the study was to identify the variables associated with bilingualism and second language acquisition in general that allow us to predict success in acquiring English as a third language. Sanz considered: socioeconomic status, gender, IQ, exposure to English, motivation to learn, age, frequency of use of Spanish and Catalan, and balanced biliteracy in reading and writing. The subjects were divided into three groups according to the balance between their two languages. This was the factor that allowed the significant prediction of better results in a CELT English language proficiency test.

Roquet Pugés and Pérez-Vidal (2008) replicated Sanz's study with a population of varying socioeconomic status, using data from compositions written by 58 pupils aged 12 to 17 years, divided into two groups, both late bilinguals, one from Cornellà, with Spanish as their L1, and one from Figueres, with Catalan as their L1. Their analysis confirmed Sanz's findings: pupils from either group who habitually read and wrote in both languages achieved a balanced bilingualism and high level in both, and higher levels in English as an L3. They were followed by pupils who failed to obtain a balance or high level and, finally, those who did not read in Spanish and Catalan. The two studies confirm the hypothesis of linguistic interdependence and the threshold level of the Canadian researchers (Bialystok 2001; Cummins 1979).

Conclusion

As shown, bilingualism can be additive and provide benefits; one might say that "it makes us better". Speaking and using two languages, the heritage of bilinguals, strongly influences the learning of a third language, as confirmed by the selection of studies reviewed here. Moreover, all four studies highlight an impact point: learners who start out at a high and balanced threshold level in terms of written competence in their first two languages (both in reading and in writing) are better prepared for learning other languages. We can conclude that:

The possibility of a bilingual education, even for speakers from bilingual families, will give individuals the opportunity to reap the benefits of bilingualism when learning an L3.

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6. "Is there any evidence to show that people who acquired a good command of two languages early on have cognitive advantages over monolingual people?"

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Early studies on bilingualism argued that it had a negative influence on the intellectual and personal development of the individual. At the beginning of the twentieth century, it was thought that learning two languages at an early age had an adverse effect, *inter alia*, on academic results and the cognitive performance of the child (Baker, 1993). This view, not without its own bias, came about partly due to the difficulty of evaluating the role of bilingualism as a unique factor in cognitive development, given that situations of bilingualism or multilingualism are very diverse and simultaneously influenced by socioeconomic, emotional and educational factors. However, today's more rigorous and precise methods of research have drawn very different conclusions.

Despite the above difficulty, several recent studies have attempted to establish the cognitive consequences of bilingualism, highlighting its positive effects and dispensing with the old view. In recent years, a number of sound empirical works have been published that focus on specific aspects of cognition. These studies show that **bilingualism** not only does not have an adverse effect on cognitive development, but that it actually **has a positive influence on several cognitive domains**. We will cite three areas of study: a) cognitive flexibility; b) metalinguistic awareness, and c) attentional control.

a) Firstly, it has been shown that when bilinguals and monolinguals are matched for age and sociocultural environment, bilinguals reveal more **cognitive flexibility** and a form of creativity known as *divergent thinking* (the production of varied and original rather than specific and precise information) (Lambert, 1974). For example,

- Peal & Lambert (1962) compared bilingual and monolingual children of the same age and sociocultural context and found that the bilinguals scored better in 15 of the 18 measures of intelligence used. They showed that bilinguals are more flexible, *inter alia*, through the use of a **symbol reorganisation** task. They concluded that bilinguals therefore show certain "cognitive advantages".
- McLaughlin & Nayak (1989) found that bilingual subjects are **more flexible in their use of language learning strategies** than monolinguals and are more willing to change strategies if the one they are using proves ineffective.

b) Secondly, an effect of bilingualism has been observed on the development of **metalinguistic awareness**, that is, on the ability to manipulate the linguistic code, reflect on language or to analyse languages, with all the positive implications that this has for language learning.

- For example, the research cited in Bialystok (1991) shows that bilingual children achieve **better results** in metalinguistic tasks:
 - For one of these tasks, the children had to judge the grammaticality of a series of sentences. The bilingual children were more successful than the monolinguals in accepting that semantically anomalous

sentences such as *"Apples grow on noses"*, were grammatically correct (Bialystok, 1986).

- Note that these types of grammaticality judgement require an attentional effort to disregard the distraction ("trick") of the meaning.

c) Thirdly, there is a group of studies suggesting that the cognitive system of bilingual speakers has to make an effort to keep the two languages separate to ensure that there is no interference between the two during the production of language and that this effort could be good **extra training for the mind**. This idea stems from the notion that, since experience has effects on cognitive performance and on the organisation and structure of the brain (as demonstrated in other areas of study), bilingualism could be one such experience with effects on cognitive performance and the organisation of the brain in the sense that the need to master two languages could lead to a more effective development of **attention control processes**. Thus, they ask themselves whether bilingualism may provide extra training in the capacity to disregard information, the ability to choose between conflicting response options or even a "cognitive reserve" in old age. We will now study the results of some of these investigations.

c.1. Empirical evidence in children:

Bialystok & Martin (2004):

Task of sorting cards by form or colour with children aged 4 to 6 years: they initially had to sort them by colour and then by the other criteria, form, suppressing the criteria used in the first phase .	Results: Age for age, the bilinguals performed the task better. Bilinguals develop the ability to solve problems with tricks or competing cues earlier.
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Bialystok, Martin & Viswanathan (2005):

Pattern of interference in the Simon task: participants had to answer with their right hand when they saw a red circle and with their left hand when they saw a blue circle. In some tests, the position in which the circle appeared (e.g. a blue circle on the right) was inconsistent with the position of the response (e.g. with the left hand), so the automatic response (to match the position of the hand with the position where the circle appears) had to be suppressed to give the correct answer.	Results: The response times were faster (and there were fewer errors) in bilinguals than in monolinguals. The Simon (interference) effect was greater in monolinguals .
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c.2. Empirical evidence in young adults:

it is difficult to test the cognitive advantages of bilinguals over monolinguals in an age range in which the attentional control system is at its peak (Costa & Hernández, 2009). Nonetheless, a number of studies have been conducted by a group of Catalan researchers on tasks involving a conflict between relevant and

irrelevant stimuli or information about which quick decisions must be made. These studies offer some very interesting findings.

Costa, Hernández & Sebastián-Gallés (2008):

<p>Task involving conflict produced by direction with 200 speakers aged 22 (100 bilingual and 100 monolingual): the participants had to decide where the central arrow in a complex stimulus was pointing; the effect of the conflict was determined by comparing the difference in response time between congruent and incongruent tests.</p> <p style="text-align: center;">Congruent test: → → → → → Incongruent test: → → ← → →</p>	<p>Results: The extent of the conflict was lower in bilinguals. The bilinguals were faster to respond.</p>
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Hernández, Costa, Fuentes, Vives & Sebastián-Gallés (2010):

<p>Numerical <i>Stroop</i> task: participants have to say how many digits are shown in each test, ignoring the identity of the digits. The <i>Stroop</i> effect arises as a result of a slower response time when the quality and quantity of the digits evoke conflicting answers.</p> <p style="text-align: center;">Congruent test: 1 22 333 Incongruent test: 11 2 33</p>	<p>Results: a clear advantage is observed for bilinguals.</p>
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c.3. Delayed onset of Alzheimer's symptoms:

Bialystok, Craik & Freedman (2007) studied the medical records of 91 monolingual and 93 bilingual patients with dementia.

- Results: the cognitive impairment of the bilingual patients began four years after that of the monolinguals (at age 75.5 in bilinguals and 71.4 in monolinguals).
- Hence, they conclude, the bilingual experience *factor* could act as a "cognitive reserve" in dementia cases.

To sum up, these studies reveal positive effects of bilingualism on aspects such as attention control - bilinguals are less distracted by irrelevant information, they switch mental tasks more quickly, etc. - and on the delay in onset of senile dementia symptoms (for a revision, see Bialystok, 2008).

The results we have seen here on the effect of bilingualism on processes of attention control and cognitive flexibility show that bilingualism is associated with an advantage in the development of these mechanisms and that this benefit is present in childhood, old age and at the stages of life where attention control processes are at their peak. Although many of the processes by which bilingualism and cognition interact are unknown, the **positive impact of bilingualism on cognitive development** is clear.

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