Social origin, language skills and scientific publication patterns in Argentina, Brazil and Chile[1]

Ana Maria Almeida*
https://orcid.org/0000-0002-4504-0423
Denis Baranger**
https://orcid.org/0000-0002-2501-4949
Juan Ignacio Piovani***
https://orcid.org/0000-0002-8774-3258

Introduction

This article aims to systematically compare the answers given by a group of researchers linked to scientific and university institutions in Argentina, Brazil, and Chile to a questionnaire focused on their sociodemographic characteristics and academic trajectory, the conditions of acquisition of English language proficiency, and the use of foreign languages in their publications (Ecapin Surveys, 2018).

The study focused on "matched" populations made up of the researchers that participate in the central core of each country's scientific system (S&T). However, given that each country has a different S&T system, it was not possible to achieve perfect equivalence. Thus, in the case of Argentina, the total number of researchers of the National Council for Scientific and Technical Research (Conicet) was taken as the population. In Brazil, researchers linked to the staff of level 7 doctoral programs (maximum qualification of the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Capes)[2] were considered. In the Chilean case, those

* Universidade Estadual de Campinas, São Paulo, Brasil.
** Universidad Nacional de Misiones, Misiones, Argentina.
*** Universidad Nacional de La Plata, Buenos Aires, Argentina.

1. The financial assistance of the Neies Mercosur Program (SPU-Capes) towards this research is hereby acknowledged (Project n. 3/2015).

2. This criterion was applied because, in Brazil, full-time researchers' affiliation with a university graduate program is the norm.

who developed projects financed by the National Fund for Scientific and Technological Development (Fondecyt) – the most competitive in the national scientific system – from 2000 to 2014.

Data collection was done by e-mail using self-administered questionnaires. In Argentina and Brazil, all members of the universe were invited to participate, while in Chile, a systematic probability sampling procedure was adopted. However, taking into account the low response rates – predictable in this type of survey – the final result in the three countries was that of voluntary or self-selected samples.

The questionnaire is composed of several sections common to the three countries. The questionnaire inquired about [basic] socio-demographic and educational characteristics, academic background and current institutional affiliation, conditions linked to the use of foreign languages, and the acquisition of English proficiency. The questionnaires were generally equivalent, although, in each country, it was necessary to make adaptations to account for local specificities, which resulted in some differences that affected the possibilities of comparison.

The questions addressed in this article are framed by what Beigel (2014) defines as the Global Academic System, in which there is a prevalence of a mainstream publication scheme composed of leading journals indexed in international databases (Beigel, 2017). In addition, there is a clear bias in favor of articles in English (Ortiz, 2009) produced mainly by Northern scholars, especially in the case of the social sciences (Mosbah-Natanson and Gringas, 2014).

In this context, issues related to the international circulation of knowledge, which depends on communication mediated by face-to-face interactions and, more importantly, by texts, take on particular relevance. The unequal distribution of the linguistic competence required to participate in these exchanges is, therefore, one of the challenges facing researchers. For those who communicate in a language other than those dominant in their field, as is the case for many researchers from less developed countries, the acquisition of language skills can be particularly difficult and, as Danell (2013) points out, operates as a barrier to publishing in mainstream journals in the Global Academic System. At the same time, in a broad sense, the question of the dominant language in science cannot be dissociated from what Phillipson (1992; 2013) calls "linguistic imperialism", which also operates in culture, education, economics and the media, among other spheres, characterized by being structural, ideological and hegemonic.

To participate in the central debates of their disciplines, researchers working in less preeminent languages must master the dominant language[3] – which many

3. However, participation in the international debates of the discipline through publication in interna-

experts consider as being already English even in the social sciences (Danell, 2013; Heilbron, 2014; Mosbah-Natanson and Gringas, 2014) –, resort to the work of translators, or entrust foreign colleagues to write papers they want to circulate to audiences outside their national or linguistic communities. All these strategies require resources that are not equally available to all: money, time, contacts, and expertise.

As obvious as this issue may seem, the academic literature on the international circulation of knowledge too often ignores how asymmetries in the mastery of a foreign language interfere with the possibility of submitting an article to a conference, a manuscript to a journal or a book to an international publisher. This article aims to contribute to fill this gap by examining the uses of foreign languages in the publications of researchers from Argentina, Brazil and Chile, working in different disciplines, relating these uses to their social profiles and, in particular, to the conditions for the acquisition of linguistic competence.

The article is organized into three sections. The first examines the modalities of language proficiency acquisition. The second section analyzes the relationship between these skills and scientific production. Finally, the third section explores how disciplinary differences play a role in the use of languages in the three countries.

Social and school trajectories and foreign language proficiency

The responses to the questionnaire used in the research made it possible to analyze in detail the modalities of acquisition and development of English skills, whether early or later in the life course, whether for family or professional reasons, and, finally, whether in the framework of processes linked to family demands, the school curriculum or the requirements of the profession.

As other studies have shown (Tsiplakides, 2018; Butler and Le, 2018; Sayer, 2018; Shin and So, 2018; Smala *et al*., 2013; Kaplan and Piovani, 2018), the responses obtained prove to what extent foreign language proficiency depends on the family and school resources made available to students. More precisely, it is evident that asking about the acquisition and mastery of a foreign language means to ask also about the social position of the researchers, that is, about the learning resources they were able to access, and even about the type of schooling and the modalities of international circulation that were available to them early in life as a function of their social position.

tional journals of the mainstream circuit does not necessarily go hand in hand with higher scientific impact or relevance in the local scientific community in the case of scientists from peripheral contexts. At least, this is what Hanafi (2011) shows in the case of science in Arab countries.

In this sense, the variation in the self-perceived level of English language proficiency of the researchers interviewed, as a whole, follows the variation in the school capital of their home of origin, as measured by the formal educational level of their fathers and mothers. As seen in Table 1, researchers from families whose parents have low school capital report lower English proficiency. The differences between groups, although narrow, are consistent. This association between English proficiency and family school capital is strongest for oral proficiency, but also present in reading comprehension and writing.

TABLE 1
Average English proficiency (scale 1-3) according to parents' educational capital

PARENTS' EDUCATIONAL CAPITAL	READING	LISTENING	SPEAKING	WRITING
Very low	2,80	2,37	2,25	2,39
Low	2,82	2,34	2,24	2,42
Medium	2,83	2,41	2,31	2,47
High	2,86	2,51	2,36	2,50
Very high	2,91	2,64	2,50	2,55
Total	2,85	2,47	2,34	2,48

Source: Ecapin Surveys.

On the other hand, according to the researchers' responses, foreign language learning occurred mainly during the formative years, especially in childhood and adolescence, or during graduate studies (see Table 2). A higher proportion of researchers from Argentina and Chile indicate that foreign language learning occurred in childhood and adolescence, while a higher proportion of researchers from Brazil mentioned that it occurred during their graduate studies. A small proportion of Chilean researchers (5%) reported having acquired proficiency in English as part of their professional practice, but this alternative response was not included in the questionnaires for Brazil and Argentina.

This result helps to explain why, among the reasons listed for learning foreign languages, the most frequently mentioned are school and academic training requirements, followed by those of professional life and, more specifically, those of publishing abroad (see Table 3). Only researchers from Brazil mention "living abroad" among the reasons for studying English. In comparative terms, personal interest and family demands weigh more among the Argentinean researchers, than the Brazilian and Chilean ones, whereas the curricular requirements of primary and secondary school count more in Chile and Argentina than in Brazil. In the latter

country, the requirement to learn English during graduate studies stands out, as already mentioned, and the need to publish in English (to a larger extent than in Argentina and Chile).

TABLE 2
Period of English language acquisition by country (%)

PERIOD DURING WHICH ENGLISH LANGUAGE SKILLS WERE ACQUIRED	Argentina	Brazil	Chile
Childhood and adolescence	71%	55%	42%
Undergraduate program	49%	41%	23%
Graduate program	51%	65%	28%
Professional practice	0%	0%	5%
n (=100%)	2390	597	208

Note: in Argentina and Brazil multiple responses were allowed; in Chile only one response was allowed.
Source: Ecapin Surveys.

TABLE 3
Reasons for studying English, by country (%)

REASONS FOR STUDYING ENGLISH	Argentina	Brazil	Chile
Personal interest	53%	51%	45%
Family requirement	35%	23%	10%
Elementary and middle school requirement	11%	9%	
High school requirement	22%	12%	
K-12 requirement			36%
Undergraduate program requirement	24%	22%	
Graduate program requirement	31%	47%	
Undergraduate or graduate program requirement			61%
To read academic texts	46%	53%	51%
For academic mobility abroad	28%	23%	38%
To interact in Chile with foreigners			21%
To publish in English	40%	44%	36%
For contact with colleagues abroad	30%	35%	29%
Living abroad (1)		29%	
n (=100%)	2390	597	208
Unlimited options in the 3 countries			
(1) This option appeared only in the Brazilian form.			

Source: Ecapin Surveys.

The use of specialized private language learning centers seems to be the most recurrent strategy for learning English, especially among Brazilian and Argentine researchers. At the same time, linguistic immersion in a foreign country is an experience shared by a good part of the researchers of the three countries. However, some differences stand out. In Brazil and Chile, learning within the family is mentioned more than in Argentina, whereas bilingual schooling is more frequent among Argentine researchers and even more so among Chileans[4]. Finally, private tutoring, which is very frequent in Brazil, where a whole sector of service provision flourishes around universities, is not mentioned in the other two countries, at least for researchers of the generations included in this study.

TABLE 4
Modalities of English language acquisition, by country (%)

MODALITIES OF ENGLISH LANGUAGE ACQUISITION	Argentina	Brazil	Chile
Within the family	4%	10%	12%
Bilingual primary or secondary education	10%	2%	17%
Non-bilingual primary or secondary education	21%	21%	38%
At a specialized private language institute	82%	72%	46%
By immersion in a foreign country	32%	44%	46%
By self-study	23%	34%	6%
By independent private tutoring	0%	25%	0%
n (=100%)	2390	597	208
Unlimited options in the 3 countries			

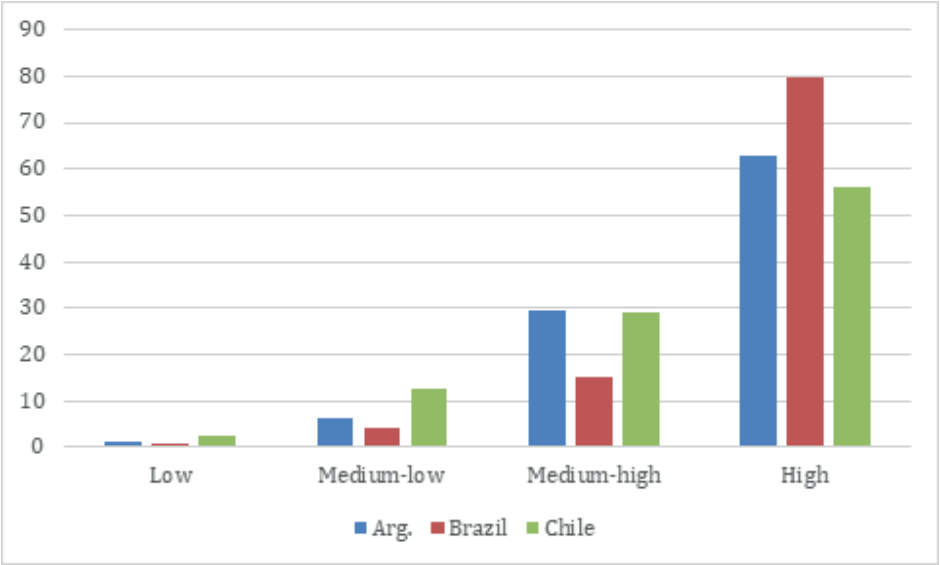
Source: Ecapin Surveys.

Regardless of the place or strategy through which the English language has been learned, researchers' perceptions of their level of proficiency vary. Those from Brazil report higher proficiency in all domains (reading, listening, speaking, writing), followed by researchers from Argentina and, in third place, those from Chile. An aggregate index of 4 levels of proficiency (low / medium-low / medium-high / high) that we have constructed considering together the four domains surveyed confirms this result. Although the majority of scientists present high (65.9%) or medium-high (26.7%) levels of English language proficiency and the samples of the three countries follow very similar patterns, Figure 1 shows some differences.

As noted above, Brazilian scientists are those who report the highest proportion of high levels of competence (79.6%), followed by Argentines (63.3%) and Chil-

4. This is consistent with the high proportion of Chilean scientists coming from elite private schools.

FIGURE 1:
English language proficiency, by country (%)



Source: Ecapin Surveys.

eans (56%). Also, among Brazilians, the percentage of those who barely reached medium-low competencies is lower (4.3%, compared to 6.4% among Argentines and 12.6% among Chileans). This result contrasts with the English Proficiency Index of the general population of each country, measured by Education First[5]. In 2019, Argentina ranked 27th globally with a score of 58.38 (high proficiency level), Chile ranked 42nd with 52.89 points (moderate level), and Brazil ranked 59th with 50.10 points (low level).

Language skills and scientific publication

Beyond the levels of proficiency in English and the ways of acquiring knowledge of this language, it is worth considering its relationship with scientific production and publication.

First, 98.2% of the Brazilians, 94.2% of the Argentines and 90.4% of the Chileans published at least one text in English. As was to be expected, publishing in this language relates to the levels of linguistic competence. Among Argentines with basic or no knowledge of English, only 42.9% have published in English, while among those with high English proficiency this figure rises to 96.4%. For Brazil-

5. https://www.ef.com/wwen/epi/.

ians, these percentages vary, for both extremes of the proficiency scale, between 80% and 99.6% and, for Chileans, between 60% and 96.6%. Among those with low linguistic competence, the contrast between the low percentage of Argentine scientists and the relatively high percentage of Brazilians with publications in English stands out.

On the other hand, the relationship between the family educational capital and the propensity to publish in English does not have the same intensity nor follow the same pattern in the three subsamples. In the Argentine sample, the differences between social groups are not significant. In the cases of Chile and Brazil, as shown in Table 5, the percentage of those who have published in English increases among those who come from households with high or very high educational capital.

TABLE 5
English-language publications by family educational capital, by country

		FAMILY EDUCATIONAL CAPITAL		
		Very low/Low	Medium	High / Very high
ARGENTINA	Has not published in English	4,9%	5,5%	6,5%
	Has published in English	95,1%	94,5%	93,5%
BRAZIL	Has not published in English	2,8%	1,9%	,8%
	Has published in English	97,2%	98,1%	99,2%
CHILE	Has not published in English	12,5%	15,4%	7,7%
	Has published in English	87,5%	84,6%	92,3%

Source: Ecapin Surveys.

However, besides assessing the existence of publications in English, it is relevant to analyze their relative weight within the total scientific production of each researcher. In the case of Argentine and Brazilian researchers, publications in English represent more than 75% of the total for 68.7% of them. For 7.5% they represent between 50 and 75%, for 4.3% between 25 and 50%, for 6.6% between 10 and 25% and for 9.8% less than 10%. The differences between Argentines and Brazilians -for whom the information is available in the database- are not notable, although the proportion of publications in English is slightly higher among Brazilians: 69.3% of them have more than 75% of their publications in this language, compared to 68.6% of Argentines, and only 8% have less than 10% of their publications in English, compared to 10.3% of Argentines.

As expected, the level of proficiency in English has a significant impact on writing strategies. Among those with basic competency, there were no cases of direct writing in English, while 22.6% wrote in their native language and sent the text for

translation. On the other hand, among those with advanced proficiency, less than 1% write in their native language and send the text for translation, and 33% write directly in English without subsequent revision.

Another strategy for publication in English is co-authorship. In the case of Argentina, only 3.2% of the scientists surveyed have not published in English as co-authors, while in Brazil, this figure rises to 4.7%. Co-authored writing strategies follow similar patterns to those of individual authorship. In the Brazilian case, an intriguing fact refers to the percentage of publications in English made in collaboration with English-speaking colleagues. While 1.8% of researchers have published all their articles in English with these colleagues, 26.6% have never published with native speakers. At the same time, 56.4% of the researchers stated that up to 50% of their articles in English were the result of collaboration with English speakers colleagues, and 12.7% said that they had more than half – but not all – of their publications in English co-authored by this type of collaborator.

Scientific disciplines and use of languages

Whether considered as "cultural structures" (Geertz, 1994, p. 24) or "institutional" (Heilbron and Bokobza, 2015, p. 8), disciplines have a social, rather than strictly epistemological, existence, from which follows a tendency to attract specific types of agents and to condition their practices (Bourdieu, 2001).

Regardless of the discipline, customarily used languages indicate the breadth of the community or scientific field in which the researcher navigates. In some cases, the command of English as a *lingua franca* is crucial, expressing the researchers level of insertion in the discipline mainstream, and their very existence as researchers. For others, this is not the case. Thus, research shows that any self-respecting physicist, for example, has to play on the global level of their discipline, while many social scientists can free themselves from this requirement. As Gantman (2012) concludes in his work on the influence of economic, linguistic and political factors on scientific productivity in different countries and disciplines, the language in which the work is presented is significant in the social sciences, as well as in medicine and agricultural sciences, but not in the exact sciences, where English is the *lingua franca*.

In what follows, we show what the data collected say about the disciplinary differences in the use of languages in Argentina, Brazil and Chile. The classification of researchers into major disciplinary areas poses some difficulties, since these are defined differently in the three countries. Thus the study adopted each country's institutional classification. Table 6 shows the composition of the samples by research area, showing that researchers who have published in English predominate widely in

most of them – reaching 100% in many cases – while the percentages are somewhat lower in the social sciences and humanities in the three countries.

TABLE 6
Composition of samples by major disciplinary areas and by country (%)

DISCIPLINARY ÁREAS BY COUNTRY	% Have published in English	n (=100%)
Argentina: Biological Sciences and Health	100,0%	702
Argentina: Exact and Natural Sciences	100,0%	601
Argentina: Social Sciences and Humanities	76,9%	590
Argentina: Technological Development	100,0%	99
Argentina: Engineering and Agrarian Sciences	99,5%	398
Brazil: Agrarian Sciences	100,0%	30
Brazil: Biological Sciences	100,0%	87
Brazil: Health Sciences	100,0%	86
Brazil: Mathematics, Physical Sciences and Geosciences	100,0%	205
Brazil: Humanities	92,8%	83
Brazil: Applied Social Sciences	92,0%	25
Brazil: Engineering	98,5%	65
Brazil: Linguistics, Letters and Arts	84,6%	13
Chile: Arts	100,0%	3
Chile: Mathematics and Physical Sciences	100,0%	90
Chile: Law, Economics and Management	75,0%	4
Chile: Social Sciences	85,7%	42
Chile: Humanities (History, Litterature, Philosophy etc.)	50,0%	24
Chile: Technology and Enginnering Sciences	95,7%	23
Chile: Technology and Medical Sciences	100,0%	10
Chile: Technology and Forestry, Agrarian and Livestock Sciences	100,0%	12

Source: Ecapin Surveys.

To obtain a synthetic approximation to the structure by domain areas of the national samples, we attempt in Table 7 to homogenize the categories based on the Argentine classification. There is some arbitrariness in this approach since, in principle, the inclusion of a researcher in one or another disciplinary area and in a particular discipline is the result of an individual choice of each respondent among

a set of alternatives provided in the survey form[6]. Furthermore, in Argentina, the "Technological Development" area can include researchers from almost any discipline (in some cases, this is the only information available)[7].

TABLE 7
Composition of samples by country according to Conicet Major Areas (%)

LARGE DISCIPLINARY AREAS ACCORDING TO CONICET	COUNTRY OF THE SURVEY		
	Argentina	Brazil	Chile
Biological and Health Sciences	29%	29%	7%
Exact and Natural Sciences	25%	34%	39%
Social Sciences and Humanities	25%	21%	35%
Technological Development	4%	0%	0%
Engineering and Agrarian Sciences	17%	16%	19%
n (=100%)	2390	597	208

Source: Ecapin Surveys.

On the other hand, in Table 7, we are the ones who decide on the inclusion of Brazilian and Chilean researchers in a large area, since the inclusion of a particular discipline or sub-discipline does not respond to easily objectifiable factors[8]. The result shows the lower weight of medical research in the Chilean sample and the greater importance of the social sciences and the humanities.

But it does not make much sense to examine the importance of English at the level of the five major disciplinary areas, since they are actually grouping disparate disciplines in reagard to the use of English. Determining a more precise relationship between language usage and discipline requires a more disaggregated analysis, at least at the level of the disciplines. We thus do not consider the large disciplpinary areas as an independent variable. In any case, the purpose of classifying researchers

6. This choice may vary throughout a researcher's career and may be due to strategic reasons on the part of the researcher.
7. "Technological Development" is a large area recently created in Conicet in response to the government's desire to increase technological research. Previously, the division of researchers among four large areas aimed at achieving a "balanced" development, meaning one in which each large area received a quarter of the resources (for example, grants and positions for researchers of the CIC). In a survey conducted on 11-Nov-2019 of the 270 CIC researchers included in that category, we found a predominance of disciplines such as Biotechnology, Chemical Engineering, Medicine, Forestry Engineering etc., and no more than five belonging to the social sciences.
8. Is a researcher that develops a vaccine working in the Medical Sciences, Natural Sciences, or Engineering? Disciplines such as "Ecology" or "Genetics" are sometimes classified in the Exact and Natural Sciences realm, other times in Biology and Health Sciences or even under Engineering and Agricultural Sciences, and so on.

into disciplines cannot be to determine non-existent "pure" categories, much less "real" ones, but only to identify groups of researchers who presumably will tend to have similarities in in terms their scientific production and publication practices[9].

For some of the disciplines surveyed in the sample, the n turns out to be insufficient. Therefore, we have set a threshold of 32 (1% of the total of the three samples) to include a discipline in the list in Table 8. Clearly, the modalities shown in the table are not exhaustive, since we have eliminated low-frequency disciplines from the list. Moreover, they are not mutually exclusive in the strict sense either, since several grouped categories have been retained, such as social sciences, which includes individuals from the disciplines that appear by themselves elsewhere in the list. But this is not a problem because our interest is to determine the extent to which different disciplines or groups of disciplines behave analogously in the three countries.

In table 8, we ordered the disciplines according to the proportion of researchers that declared having published more than 75% of their bibliographical output in English (fourth column). This indicator is more appropriate for estimating the importance of the English language in each given discipline than simply acknowledging the existence of one publication. Indeed, the high percentages of English publications in some of them show that the scientific community of reference for the researchers is primarily Anglophone, so that publication in English becomes an indispensable condition for belonging to the field. At the bottom of the table, the percentages are close to 0% for some of the social sciences and humanities. It indicates that, for those disciplines, English is far from playing the leading role.

The second column indicates the percentage of researchers in each discipline who self-assessed themselves as having an "advanced" level of written expression. The data show that this does not seem to affect the possibility of publishing in English. Although the percentage of researchers declaring a high proficiency tends to decrease as one moves down the list, the correlation with the publishing output is far from perfect. As seen in the previous section, researchers circumvent the obstacles of writing in English in multiple ways. One of them is writing with a proficient colleague, which is favored when the multi-author publication mode predominates, as is the case in the natural and medical sciences domains seen at the top of the table.

Regarding the publication in other languages, the comparative analysis will be limited to Argentina and Brazil since the Chilean survey does not provide this information.

9. Strictly speaking, for a definition of the researchers' habitus, it would be necessary to disaggregate the data even more, taking into account sub-disciplines and subjects of study. That is why Bourdieu, for example, did not refer to biologists "in general" but to molecular biologists, or to the case of phage workers (who study bacteriophages) as "an example of a group endowed with a distinctive culture and a normative structure that has played the role of integration factors" (2001, p. 135).

TABLE 8
Writing and publishing proficiency in English, by discipline (%)

DISCIPLINES	Advanced English writing	Have published in English	> 75% of publications in English	n
Chemistry	61%	100%	91%	202
Physics	77%	100%	90%	229
Astronomy	76%	100%	90%	50
Biochemistry	69%	100%	90%	48
Mathematics	79%	100%	88%	58
Computer Sciences	92%	100%	86%	51
Medical Sciences	67%	100%	86%	265
Biology	62%	100%	84%	535
Veterinarian Sciences	55%	100%	80%	51
Engineering	56%	99%	77%	303
Technological Development	43%	100%	77%	99
Agrarian Sciences	57%	99%	72%	154
Geosciences, Water and Atmospheric Sciences	53%	100%	65%	201
Economics	63%	97%	43%	35
Psicology	38%	94%	21%	52
Education	33%	88%	16%	49
Social Sciences	46%	76%	8%	63
History	31%	66%	6%	95
Political Science	37%	80%	4%	46
Antropology	35%	88%	3%	34
Philosophy	62%	85%	2%	66
Sociology	30%	74%	1%	104
Archeology	33%	96%	0%	55
Social and Cultural Anthropology	28%	79%	0%	43
Literature	43%	59%	0%	49

Source: Ecapin Surveys.

TABLE 9
Researchers who published in other languages according to publication in English (%)

	Argentina		Brazil	
OTHER LANGUAGES	English No	English Yes	English No	English Yes
Spanish			64%	25%
Portuguese	13%	9%		
French	12%	7%	73%	11%
German	5%	4%	0%	4%
n (=100%)	138	2835	11	583

Source: Ecapin Surveys.

Table 9 shows, first of all, that the third most important language of publication is, as expected, Portuguese for Argentines and Spanish for Brazilians. French and, finally, German follow.

Generally, the percentages of third languages are higher among those who have not published in English, thus denoting a possible alternative form of internationalization (although marginal: there are only 11 – 2% – of Brazilians who have not published in English). It is remarkable how the percentages are much higher for Brazilians than for Argentines (except for German, which is of minimal importance).

Table 10 shows the disciplines in which publication in third languages is most important. The role of German is marginal, reaching significant figures for philosophy (33%) and, to a much lesser extent, for literature (11%) and sociology (9%). Publication in French is almost non-existent in the so-called hard sciences, reaching some relevance in the social sciences and the humanities. As for Spanish and Portuguese, it is remarkable how Brazilians, in all disciplines, exhibit higher percentages of publication in these languages than Argentines[10].

Finally, Table 11 allows us to compare researchers from Argentina and Brazil. It is interesting to note the differences. For example, in some hard sciences, the importance of publications in English is lower in Brazil than in Argentina. The reason for these differences is not immediately clear. It could be the effect of the age of the Brazilian researchers included in this sample. Since they are older than the Argentinians, they could have begun publishing at a time when English was less important. Other possibility is that they have a more substantive national agenda than their Argentinian counterparts.

10. We have kept "Anthropology" and "Social and Cultural Anthropology" separate. In Argentina, the first includes biological anthropologists (although not only these), while in Brazil, in the absence of a separate option, it also concentrates social anthropologists. Thus, 58% of Brazilian anthropologists who have published in Spanish should be compared with 44% of Argentine "social" anthropologists who have done so in Portuguese.

TABLE 10
Researchers who published in other languages, by discipline (%)

DISCIPLINE	French	Portuguese	Spanish	German	n (= 100%)
Anthropology	17%	12%	58%	3%	29
Cultural and Social Anthropology	22%	44%		5%	41
Archeology	5%	11%		5%	55
Astronomy	6%	5%	8%	0%	50
Biology	3%	5%	13%	1%	505
Biochemistry	0%	7%	0%	2%	47
Earth, Water and Atmospheric Sciences	3%	6%	20%	4%	195
Agrarian Sciences	2%	3%	22%	1%	145
Medical Sciences	4%	2%	39%	2%	255
Political Sciences	18%	26%	33%	9%	45
Social Sciences	17%	7%	44%	2%	46
Computing Sciences	12%	0%	11%	4%	49
Technological Development	5%	5%	29%	3%	99
Economics	9%	4%		6%	35
Education	18%	20%	48%	7%	45
Philosophy	23%	18%	40%	33%	61
Physics	4%	7%	13%	2%	218
History	30%	22%	55%	6%	89
Engineering	5%	7%	23%	3%	278
Literature	26%	20%	67%	11%	47
Mathematics	12%	3%	10%	2%	57
Psychology	8%	26%	40%	0%	49
Chemistry	2%	3%	11%	3%	196
Sociology	24%	28%	73%	9%	96
Veterinary Sciences	4%	11%	33%	6%	48
Total	8%	9%	26%	4%	2987

Source: Ecapin Surveys.

TABLE 11
Researchers with more than 75% of their publications in English, by discipline and country (%)

	% with >75% publ. English	
DISCIPLINE	Argentine	Brazil
Anthropology	6%	0%
Social and Cultural Anthropology	0%	
Archeology	0%	
Astronomy	89%	92%
Biology	91%	76%
Biochemistry	98%	50%
Earth, Water and Atmospheric Sciences	66%	73%
Agrarian Sciences	78%	67%
Medical Sciences	97%	71%
Political Sciences	5%	0%
Social Sciences	0%	31%
Computing Sciences	100%	82%
Technological Development	77%	
Economics	36%	71%
Education	0%	32%
Philosophy	2%	0%
Physics	97%	91%
History	0%	55%
Engineering	86%	77%
Literature	0%	0%
Mathematics	94%	81%
Psychology	9%	53%
Chemistry	96%	85%
Sociology	0%	9%
Veterinarian Sciences	87%	67%

Source: Ecapid surveys.

Discussion and conclusions

One of the main issues addressed in this article is the relationship between socioeconomic status and the acquisition of foreign language skills. In line with the findings of previous studies such as Kaplan and Piovani (2018) for the Argentine case and Borges and Garcia Filice (2016) for the Brazilian case, we found an association between the social origin of scientists and the acquisition of foreign languages. Researchers coming from families with higher educational capitals present higher English skills. They tend to acquire them earlier through formal education and within the family. In addition, they have also completed their doctorates in U.S. universities in a higher proportion than their colleagues from lower social origins. Besides showing the link between social origin and foreign language acquisition, this result is relevant for understanding the production and circulation of knowledge. Scientists trained in English-speaking countries show a larger propensity to publish in English and in the mainstream publishing circuit, as noted by Gantman (2011) and Calvo *et al*. (2019). They also have more opportunities for developing academic links with English-speaking colleagues, which can translate in coauthored publications with them. As evidenced in this article, this is one of the strategies that facilitates publication in English. In this regard, Gingras and Mosbah-Natanson (2010) point out that social science researchers from peripheral regions such as Africa, Asia, and Latin America manage to insert themselves into the international scientific circuit by strengthening their collaboration with colleagues from other regions, especially North America and Europe. These authors indicate that, by 2005, more than 30% of the articles published by Latin American social scientists in the mainstream circuit resulted from international collaboration, and that 67.5% of those involved colleagues from the United States and Canada.

Regarding scientific publication patterns, most researchers in the sample have published in English, regardless of their level of competence. In the case of Argentina, there is no clear relationship between social origin and having published at least once in English. Among Brazilian and Chilean researchers, though, the proportion of those who have published at least once in English is somewhat higher among those who come from households with higher educational capital.

In addition, the level of competence in English affects how researchers write. Those who are more proficient publish more texts written autonomously, without sending them for translation, and even with less need to seek the review of a native English speaker or a colleague with better language knowledge. However, when considering the most internationalized subgroup, i.e., those who have published at least 75% of their total production in English, the relationship between the level of

competence and publication vanishes. The writing strategies still vary though, with those who have better proficiency being more autonomous.

Brazilian scientists are, on average, the ones who publish the most in English, although they make up the oldest sample. This result may be relevant if one assumes that the diffusion of English teaching and the weight of this language in the scientific system have increased over time[11]. Unlike their younger colleagues in Argentina and Chile, who predominantly report having developed language skills during childhood and adolescence, a higher proportion of Brazilian scientists have acquired them during graduate studies. This result suggests that, at least in this country, the language competence of researchers seems to be closely associated with the academic profession. This association seems to indicate that the use of English in scientific writing and publication does not depend as much on early language acquisition as on the degree of professionalization and internationalization of the scientific systems in which the researchers navigate.

This explanation would explain, for example, the high proportion of Brazilian scientists who, even with little or no knowledge of English, have published in this language (80%), compared to 60% of Chileans and, especially, with 42.9% of Argentines. In the case of Spanish-speaking scientists, the literature notes other explanatory factors for variation in publication styles. Gantman and Fernández Rodríguez (2016), for example, show that participation in the segment of international publications in English, as opposed to the segment of local/regional publications in the researchers' language, seems to be strongly influenced by the type of higher education institution to which they are affiliated. This seems convergent with the findings of this article, insofar as the institutions whose researchers publish more predominantly in the international circuit are, at the same time, more professionalized and internationalized.

Chilean scientists, meanwhile, are the ones who publish the least in English. This result seems to contradict a number of key issues: a) the larger proportion of Chilean researchers with PhDs in English-speaking countries (since them, as has already been pointed out, tend to publish more in English); b) the scientific and university policies which, in this country, promote mainstream publications through monetary prizes. But it should be borne in mind that the Chilean sample is the one with the highest weight of social and human sciences – more than 30% of the total –, and that these

11. Regarding the characteristics of the sample, we recall that, in the Brazilian case, it is composed of the teaching-research staff of the doctoral programs with the highest Capes rating. Given that this institution gives considerable weight to internationalization and that among its indicators is publishing in foreign journals, it follows that, by definition, the teachers-researchers of the best-evaluated programs are usually those who have published the most in foreign languages.

disciplines are, in turn, the ones with the lowest proportions of publication in English in all countries. Furthermore, although Chilean scientists – as already mentioned – are the ones who, in the highest proportion, obtain their doctorates in English-speaking countries, in the case of the social sciences and the humanities, Spanish doctorates stand out in the first place – and by a considerable margin. Therefore, the lower proportion of researchers with publications in English in the Chilean sample could be explained by its own composition, given the association observed between scientific disciplines and the propensity to publish in English.

Indeed, researchers in the social sciences and the humanities publish less in English in all three countries, especially in Argentina. This result is in line with a less internationalized system, i.e., presenting a higher proportion of researchers born in the country who have pursued their PhDs locally. It is also in line with a relatively more heterodox system regarding publication patterns compared to the standard models promoted by mainstream journals (Calvo *et al*., 2019; Piovani, 2019). This lower propensity of Argentine social sciences and humanities researchers to publish in English compared to their Chilean and Brazilian colleagues (see Fiorin, 2007; Finardi and França, 2016; Madeira and Marenco, 2016, among others, for the case of international publications of Brazilian social sciences and humanities researchers), had already been pointed out by Gibert Galassi (2013) and can be ratified by resorting to secondary data such as those produced by Scimago about publications in mainstream journals.

The importance of publications in other languages is also noticeable in the social sciences and the humanities, although less so if compared to English. This result is consistent with the findings of Baranger and Niño (in press) for the researchers in these disciplines affiliated to the Conicet in Argentina, especially concerning what the authors call the "universalist model" of publication. It ratifies the relevance of the German tradition in philosophy and the weight of the French one in sociology, psychology, and other social sciences.

The larger importance of Spanish and Portuguese -among the third languages- in the publications of Brazilians and Argentines, respectively, results most likely from the similarities between both languages and from the geographical proximity and historical links that also involve the university and scientific systems. This result could provide empirical support to the idea of emerging regional circuits as an alternative to the mainstream, which authors such as Beigel (2014), Collyer (2018), Heilbron (2014), Piovani (2019), and Vessuri, Guédon, and Cetto (2014), among others, have referred.

Finally, as regards scientific disciplines and their relationship with publication in English, the very low – or even zero – percentages of researchers in social sciences

and humanities who publish predominantly in this language suggest that it is still far from playing the leading role that it evidently does, as a *lingua franca*, in the natural and biomedical sciences, even in Latin America. The regional scope of this statement is relevant because, as Gingras and Mosbah-Natanson (2010) point out, and depending on the database used, by the beginning of the 21st century between 85% and 95% of social science publications in the mainstream circuit were already written in English. However, the lower relative participation of publications in English in the total production of Latin American social scientists does not necessarily imply a lack of internationalization. On the contrary, as noted above, the weight of other languages, particularly Portuguese among Argentines and Spanish among Brazilians, validates what Baranger and Niño (in press) indicate about the universalist model of publication, as well as about the importance of the Ibero-American circuit for the internationalization of Latin American scientists (Baranger and Beigel, 2021).

At the same time, the data presented in this article can be interpreted to some extent as supporting Bourdieu's (2001) hypothesis, according to which differences in the social position and trajectory of the researchers can explain their attraction to specific disciplines. However, it would be necessary to carry out a much more detailed analysis to show how this factor influences the differences in competencies and publication practices among researchers.

Bibliographic References

Baranger, Denis & Beigel, Fernanda. (2021), "La publication en Ibéro-Amérique en tant que mode d'internationalisation des chercheurs en sciences humaines et sociales du Conicet (Argentine)". *Revue d'Anthropologie des Connaissances* [En ligne], 15 (3).

Baranger, Denis & Niño, Fernanda. (e/p), "El espacio de las disciplinas sociales en el Conicet". In: Piovani, Juan Ignacio *et al*. (orgs.). *Las ciencias sociales en la Argentina contemporánea*. Santa Fé, Ediciones unl – Clacso.

Beigel, Fernanda. (2014), "Introduction: Current tensions and trends in the World Scientific System". *Current Sociology*, 62 (5): 617-625.

Beigel, Fernanda. (2017), "Científicos periféricos, entre Ariel y Calibán. Saberes institucionales y circuitos de consagración en Argentina: Las publicaciones de los investigadores del Conicet". *Dados: Revista de Ciências Sociais* 60 (3): 825-865.

Borges, Rovênia Amorim & Garcia-Filice, Renísia Cristina. (2016), "A língua inglesa no Programa Ciência sem Fronteiras: paradoxos na política de internacionalização". *Interfaces Brasil/Canadá*. 16 (1) : 72-101.

Bourdieu, Pierre. (2001), *Science de la science et réflexivité*. París, Seuil.

Butler, Yuko Goto & Le, Vi-Nhuan. (2018), "A longitudinal investigation of parental social--economic status (ses) and young students' learning of English as a foreign language". *System* 73: 4-15, abril.

Collyer, Fran. (2018), "Global patterns in the publishing of academic knowledge: Global North, global South". *Current Sociology*, 66 (1): 56-73.

Danell, Rickard. (2013), "Geographical diversity and changing communication regimes. A study of publication activity and international citation patterns". In: Danell, Rickard *et al*. (orgs.). *Social science in context: Historical, sociological, and global perspectives*. Lund, Nordic Academic Press.

Finardi, Kyria Rebeca & França, Claudio. (2016), "O inglês na internacionalização da produção científica brasileira: evidências da subárea de Linguagem e Linguística". *Intersecções*, 9 (2): 234-250.

Fiorin, José Luiz. (2007), "Internacionalização da produção científica: a publicação de trabalhos de Ciências Humanas e Sociais em periódicos internacionais". *Revista Brasileira de Pós-Graduação*, 4 (8): 263-281

Gantman, Ernesto. (2011), "La productividad científica argentina en ciencias sociales: economía, psicología, sociología y ciencia política en el Conicet (2004-2008)". *Revista Española de Documentación Científica*, 34 (3): 408-425.

Gantman, Ernesto. (2012), "Economic, linguistic, and political factors in the scientific productivity of countries." *Scientometrics*, 93 (3), 967-985.

Gantman, Ernesto & Fernández Rodríguez, Carlos J. (2016), "Literature segmentation in management and organization studies: The case of Spanish-speaking countries (2000-10)". *Research Evaluation*, 25 (4), 461-471.

Geertz, Clifford. (1994), *Conocimiento local. Ensayos sobre la interpretación de las culturas*. Barcelona, Paidós.

Gibert Galassi, Jorge. (2013), *Autonomía y dependencia en las ciencias sociales latinoamericanas: un estudio de bibliometría, epistemología y política*. Buenos Aires, Clacso.

Gingras, Yves & Mosbah-Natanson, Sébastien. (2010), "Where are social sciences produced?". In: *World social science report. Knowledge divides*. Paris, Unesco.

Hanafi, Sari. (2011), "University systems in the Arab East: Publish globally and perish locally vs publish locally and perish globally". *Current Sociology*, 59 (3), 291-309.

Heilbron, Johan. (2014), "The social sciences as an emerging global field". *Current Sociology*, 62 (5): 685-703.

Heilbron, Johan & Bokobza, Anaïs. (2015), "Transgresser les frontières en sciences humaines et sociales en France". *Arss*, 215: 108-121.

Kaplan, Carina & Piovani, Juan Ignacio. (2018), "Capitales y trayectorias socioeducativas". In: Piovani, Juan Ignacio & Salvia, Agustín (orgs.). *La Argentina en el siglo xxi. Cómo somos, vivimos y convivimos en una sociedad desigual*. Buenos Aires, Siglo Veintiuno.

Madeira, Rafael Machado & Marenco, André. (2016), "Os desafios da internacionalização: mapeando dinâmicas e rotas da circulação internacional". *Revista Brasileira de Ciência Política*, 19: 47-74.

Mosbah-Natanson, Sébastien & Gingras, Yves. (2014), "The globalization of social sciences? Evidence from a quantitative analysis of 30 years of production, collaboration and citations in the social sciences (1980-2009)". *Current Sociology* 62 (5): 626-646.

Ortiz, Renato. (2009), *La supremacía del inglés en las ciencias sociales*. Buenos Aires, Siglo Veintiuno.

Phillipson, Robert. (1992), *Linguistic imperialism*. Oxford, Oxford University Press

Phillipson, Robert. (2013), "Linguistic imperialism". In: Chapelle, Carol A. (org.). *The Encyclopedia of Applied Linguistics*. Chichester, Wiley.

Piovani, Juan Ignacio. (2019), "Styles of academic production in the Argentine social sciences: heterogeneity and heterodoxy". *Serendipities. Journal for the Sociology and the History of the Social Sciences*, 4 (1-2): 27-48.

Sayer, Peter. (2018), "Does English really open doors? Social class and English teaching in public primary schools in Mexico". *System*, 73: 58-70.

Shin, Hye Won & So, Youngsoon. (2018), "The moderating role of socioeconomic status on motivation of adolescents' foreign language learning strategy use". *System*, 73: 71-79.

Smala, Simone *et al*. (2013), "Languages, cultural capital and school choice: distinction and second-language immersion programmes". *British Journal of Sociology of Education*, 34 (3): 373-391.

Tsiplakides, Iakovos. (2018), "Shadow education and social class inequalities in secondary education in Greece: the case of teaching English as a foreign language". *International Journal of Sociology of Education*, 7 (1): 71-93.

Vessuri, Hebe *et al*. (2014), "Excellence or quality? Impact of the current competition regime on science and scientific publishing in Latin America and its implications for development". *Current Sociology*, 62 (5): 647-665.

Abstract

Social origin, language skills and scientific publication patterns in Argentina, Brazil and Chile

This article analyzes the conditions of acquisition of linguistic competence in the English language and the use of foreign languages in the publications of researchers from Argentina, Brazil and Chile. The analysis is based on the results of a cross-national survey carried out on samples of the researchers most integrated into the central nucleus of the scientific system of each country. In relation to the main focus of the article, the modalities of acquisition of linguistic competence and its relationship with sociodemographic factors, such as social origin, and with the educational trajectory are addressed. On the other hand, the association between linguistic competence and scientific publication, and the place of scientific disciplines in the use of foreign languages are analyzed. The results show that there is a connection between social origin, educational trajectory, ways of acquiring English skills and the level of these skills. However, and regardless of their linguistic proficiency, the majority of researchers in the three countries publish in English and, in any case, their level of competence has an impact on writing strategies (whether autonomous, collaborative or mediated by professional translation). In comparative terms, Brazilian scientists publish the most in English, although in the Chilean case the lower proportion of publications in this language could be due to the greater weight of social and human scientists in the sample, since, in these disciplines, at least in Latin America, English has not acquired a lingua franca *status* equivalent to that of the natural sciences.

Keywords: Linguistic skills; Scientific publication; Social origin; Argentina; Brazil; Chile.

Resumo

Origem social, competências linguísticas e padrões de publicação científica na Argentina, Brasil e Chile

Este artigo analisa as condições de aquisição de competência linguística em língua inglesa e o uso de idiomas estrangeiros nas publicações de pesquisadores da Argentina, Brasil e Chile. A análise se baseia nos resultados de um questionário *cross-national* respondido por uma amostra do conjunto de pesquisadores integrados ao núcleo central do sistema científico de cada país. O foco principal do artigo são as modalidades de aquisição da competência linguística e sua relação com características sociodemográficas, como a origem social, e com a trajetória de formação. Além disso, o artigo analisa a relação entre as competências linguísticas e a publicação científica, e explora a variação disciplinar no uso de idiomas estrangeiros. Os resultados mostram que existe uma associação entre origem social, trajetória de formação, modalidades de aquisição da competência em inglês e o nível dessas competências. No entanto, independentemente do domínio da língua, a maioria dos pesquisadores dos três países publica em inglês, e, em todos os casos, seu nível de competência tem impacto sobre suas estratégias de escrita (autônomas, colaborativas ou via tradução profissional). Em termos comparativos, os pesquisadores brasileiros são os que mais publicam em inglês, embora, no caso chileno, a menor proporção de publicações nessa língua

possa se dever ao maior peso dos pesquisadores em ciências sociais e humanas na amostra, uma vez que, nessas disciplinas, pelo menos na América Latina, o inglês não adquiriu o mesmo *status* de língua franca que nas ciências naturais.
Palavras-chave: Competências linguísticas; Publicação científica; Origem Social; Argentina; Brasil; Chile.

Resumen

Origen social, competencias lingüísticas y patrones de publicación científica en Argentina, Brasil y Chile

En este artículo se analizan las condiciones de adquisición de competencia lingüística en lengua inglesa y el uso de idiomas extranjeros en las publicaciones de investigadores de Argentina, Brasil y Chile. El análisis se basa en los resultados de una encuesta *cross-national* realizada a muestras de investigadores integrados al núcleo central del sistema científico de cada país. En relación con el foco principal del artículo, se abordan las modalidades de adquisición de la competencia lingüística y su relación con factores sociodemográficos, como el origen social, y con la trayectoria formativa. Por otra parte, se analiza la relación entre las competencias lingüísticas y la publicación científica, y se explora el lugar de las disciplinas en el uso de idiomas extranjeros. Los resultados ponen en evidencia que existe una asociación entre el origen social, la trayectoria formativa, las modalidades de adquisición de competencias en inglés y el nivel de dichas competencias. Sin embargo, e independientemente de su dominio de la lengua, la mayoría de los investigadores de los tres países publica en inglés y, en todo caso, su nivel de competencia tiene incidencia en las estrategias de escritura (autónomas, colaborativas o por traducción profesional). En términos comparativos, los científicos brasileños son los que más publican en inglés, aunque en el caso chileno la menor proporción de publicaciones en esta lengua podría deberse al mayor peso que tienen en su muestra los investigadores de ciencias sociales y humanas, toda vez que, en estas disciplinas, al menos en América Latina, el inglés no ha adquirido un estatus de lingua franca equivalente al de las ciencias naturales.
Palabras clave: Competencias lingüísticas; Publicación científica; Origen social; Argentina; Brasil; Chile.

Texto recebido em 14/12/2021 e aprovado em 12/07/2022.
DOI: DOI: 10.11606/0103-2070.ts.2022.193439

Ana Maria Almeida é professora titular da Faculdade de Educação da Unicamp. Suas pesquisas examinam a contribuição da escola para a produção e reprodução das desigualdades e os efeitos da circulação internacional de teorias, modos de análise e retóricas de validação sobre a produção e difusão de dispositivos de governo na área educacional. Coordena o Grupo de pesquisa sobre

Educação, Instituições, Desigualdades (Focus). É editora associada de *Educação & Sociedade*. É co-coordenadora da Comissão Gênero e Sexualidade da Unicamp e co-chair do Gender Working Group do Global Research Council. E-mail: aalmeida@unicamp.br.

Denis Baranger é sociólogo, professor emérito da Unam (Argentina), com funções docentes e de pesquisa no Programa de Pós-Graduação em Antropologia Social. Especializado em metodologia e epistemologia, trabalha com a recepção da obra de Bourdieu na Argentina e na América Latina e o campo argentino das ciências sociais. É autor de *Epistemologia e metodologia na obra de Bourdieu* (Buenos Aires, Prometeo, 2004) e de outros livros, além de numerosos artigos e capítulos publicados na Argentina e no exterior. Em 2016 recebeu o Prêmio Konex, Diploma al mérito en Sociología. E-mail: baranger.denis@gmail.com.

Juan Ignacio Piovani é professor titular da Facultad de Humanidades de la Universidad Nacional de La Plata (Argentina) e pesquisador principal do Conicet e Mecila. Dedica-se a temas relacionados com a história dos métodos e técnicas de pesquisa, com o campo das ciências sociais na Argentina, com o mercado de trabalho e as desigualdades sociais. É autor de vários livros e numerosos artigos publicados em revistas europeias e latino-americanas. E-mail: juan.piovani@presi.unlp.edu.ar.