

Sociolinguistic and Translingual Practices in the Discourse of Astronomers in Argentina

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Abstract

This paper examines the sociolinguistic practices of a particular scientific and discourse community. To that end, I analyze seminars delivered by PhD students of astronomy at the Institute for Theoretical and Experimental Astronomy (located in Córdoba, Argentina, and associated with the National Scientific and Technical Research Council, and the National University of Córdoba). The main assumption guiding this research is that these seminars constitute relevant instances in the incorporation of a specific scientific and linguistic habitus during the process of academic socialization of doctorates. From a sociolinguistic perspective, I outline two main traits from within the discourse of these early career astronomers: the paper-like structure of their oral presentations (an indicator of the prevalence of writing as the dominant mode of scientific communication, as shown by the transfer of written stylistic conventions into spoken language), and the naturalization of the presence and use of the English language through creative translingual practices.

Keywords

astronomy; sociolinguistics; semiotic resources; linguistic habitus

Introduction

Academic discourse as a specific genre has been the subject of a great deal of analysis and conceptualization over the last few decades, especially since the work of John Swales (1990), a linguist specializing in English for Academic Purposes. Since then, as the same author indicates, the vast majority of the literature on academic discourse has focused on writing (Swales 2019). According to scholarly writing specialists Mary Jane Curry and Theresa Lillis (2004), there is a large body of research on the textual products produced by

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multilingual¹ scientists, mostly focused on the rhetorical, stylistic, and grammatical characteristics of these texts rather than on the practices, experiences, and processes of academic socialization. This trend began to reverse with works that move away from purely textual approaches and, instead, consider academic writing and publishing as social and situated practices. Consequently, at the international level, research on the geopolitics of scholarly writing and publishing, as well as the experience of multilingual and increasingly mobile scholars, is already a dynamic and consolidated area of study.

In Latin America, the link between scientific practice and language, as a possible point of contact between sociolinguistics and the social studies of science and technology or studies in science, technology and society,² is still a scarcely explored area. It is true that in recent decades the forms of academic literacy and of the acquisition of literacy skills in relation to higher education have aroused great interest, with Paula Carlino (2003, 2005) as one of the introducers of this perspective in the region. Referents in the field of sociolinguistics applied to the scientific field include Renato Ortiz (1997, 2009) in Brazil (from the point of view of the cultural studies of globalization), and Rainer Hamel (2007, 2008, 2013) in Mexico (whose work is related to language policy and linguistic rights). On the other hand, Latin American scholars have taken language as a relevant variable in the analysis of publication patterns and evaluation regimes (Kreimer 2011; Vessuri, Guédon, and Cetto 2014; Beigel 2019, among others). These studies usually frame language within broader considerations of the production, circulation and reception of scientific knowledge at the regional or global level, in view of the growing internationalization of the field.

Despite this growth, Latin America is still underrepresented in the literature on sociolinguistic policies and practices for research and publication purposes in an increasingly internationalized scientific field, as Curry and Lillis (2017) and, more recently, Kátia Monteiro and Eliana Hirano (2020) have observed. Moreover, a study of language in use within the scientific field and the ways of acquiring legitimate forms of expression in different disciplinary fields, i.e., a sociolinguistic study that integrates different analytical levels, has been rarely conducted in the region. Therefore, relatively little attention has been paid to the level of day-to-day interactions within laboratories or offices, which, I will argue, are key to understanding how academic discourse is constructed, reproduced, and changed over time.

I start from Jan Blommaert's (2005) proposal that the ethnographic study of the relationship between scientists, language, and linguistic practices constitutes a privileged outlook on the routines through which certain patterns creep into everyday behavior and how these patterns, in turn, lead to the construction of these routines. This position, of Bourdieusian influence, considers discursive practice as the relational result of the interaction between the individual and the context, between the embodied history of the field (represented by each agent's habitus, a result of individual social trajectories) and its reified history (the field's current objective structures, an outcome of past struggles) (Salö 2015). Indeed, the globalized scientific field is not a uniform space and the sociolinguistic practices of local actors have to be understood

¹ Throughout this article I use this term in the sense of Curry and Lillis (2014), who consider "multilingual" to be those scholars who usually work, research and publish in two or more languages.

² In Latin America, the institutionalization of STS as a field began in the 1980s and continued to be consolidated in the 1990s (Kreimer 2007).

in the framework of the current world scientific system (Beigel 2014a, 2014b). If peripheries, semi-peripheries and scientific centers are separate and different spaces, but at the same time interconnected and interdependent, the symbolic and linguistic products flowing between them will be produced, circulated, appropriated and valued in structurally unequal contexts: “Inequality, not uniformity, organizes the flows and the particular nature of such flows around the ‘globe.’” (Blommaert 2003, 612).

With these considerations in mind, in this article I outline some linguistic features of the discourse produced by the astronomy community in Córdoba, Argentina, particularly by PhD candidates. The data examined come from my attendance and ethnographic observation at six seminars delivered by students of the PhD program in astronomy of the Faculty of Mathematics, Astronomy, Physics, and Computer Science (FAMAF) of the National University of Córdoba (UNC). All of these doctoral students have a grant from the National Council for Scientific and Technical Research (CONICET) and their place of work is at the Institute of Theoretical and Experimental Astronomy (IATE), a CONICET-UNC double-dependency unit located on the premises of the Astronomical Observatory of Córdoba (OAC), also belonging to the same university. The hypothesis guiding this work is that these seminars are relevant instances in the incorporation of the scientific and linguistic *habitus* (Bourdieu 1977) specific to the discipline of the young researchers. That is to say, they are part of a broader process of academic socialization during which not only conceptual and methodological competence is acquired, but also the rhetoric specific to this disciplinary area is incorporated. It is in this sense that we think of scientific fields and subfields as communities of practice and discourse (Swales 2016).

Among the characteristics of these presentations, what stands out is a fixed structure similar to that of scientific articles: written stylistic conventions seem to permeate oral discourse. This is an indicator of the prevalence of writing as the dominant mode of intra-disciplinary scientific communication (Verón 1998). However, they are also an instance of communication where the paper format is not reproduced as such, but negotiated, giving room for a certain rhetorical diversity related to the construction of a voice of one’s own as a scientist and as a speaker. Likewise, the presence and use of English is taken as natural (even when addressing an audience and conversing among Spanish-speaking peers), but mediated through creative and generative translanguaging practices (Canagarajah 2019).

This article is thus divided into three sections. First, I develop the main theoretical tools that guide my view of the phenomenon under study, this is, the translanguaging view of linguistic practice interweaved with Bourdieusian concepts of field, linguistic market, and linguistic capital and *habitus*. Second, I describe the context where this ethnographic research took place, and my methodological decisions. Third, I present the main results regarding the presence of writing conventions in oral communications, the influence of evaluation regimes, and the concrete ways in which English is incorporated into a predominantly Spanish discourse. Finally, I analyze and relate these data to the theory, and I synthesize the main points raised in the article, as well as some possible future lines of research.

The Internationalized Scientific Field: A Market for (Trans)Lingual Goods

The fields that make up social space, as conceived by Bourdieu, can be considered today as transnational fields, i.e., transcending the borders of nation-states. These fields, according to Canagarajah (2019), do not refer to places, but to constructed and emergent spaces where practices and relationships between subjects coming from different national and cultural backgrounds are located. The author places the *transnational* in

the liminal space that emerges above and across multinational relations, instead of being a mere number of interrelated countries.

With this conceptualization in mind, we can follow Canagarajah ([ibid.](#)) in thinking that, to a greater or lesser extent, we are all immersed in transnational social fields. Without the need for physical mobility, different influences (such as the experience of migration or contact with migrants, or the consumption of media, messages, cultural products and technologies) are present in almost every aspect of everyday life.

While these influences reconfigure local rootedness, two opposing trends are attributed to globalization: on the one hand, the progressive unification of lifestyles at a global level; on the other hand, the emergence of new heterogeneities through the emergence of new identities or the radicalization of existing ones. Indeed, the homogenizing and integrating power of globalization coexists with a growing affirmation of diversity(ies). Both trends may seem contradictory, but are two sides of the same phenomenon: a deterritorialization of cultures and groups of belonging, in a context where the traditional division between the local, the national and the global (or international) is no longer applicable ([Hamel 1995](#)). In this respect, the growing interconnection of individuals and groups, increasingly visible (and even exacerbated) throughout the twentieth century and in these first decades of the twenty-first century, breaks down the traditional association between culture and territory, between space and time ([Ortiz 2009](#)). And, it might be added, between space, culture and language. As people move, so do meanings, systems of meaning, patterns of interaction and worldviews, which are rearticulated and reorganized in their new contexts of appropriation and circulation.

These general considerations about the relationship between language, culture and space in a context of globalization can be very well applied to the scientific-academic field. The practice and institutions of modern science and technology, as conceived in the West, have followed a long but steady path of global expansion since sixteenth and seventeenth-century Europe. Today there is a certain standardization (mentioned earlier as the homogenizing tendency of globalization) in the values that are conceived as proper to the field and as to what constitutes a successful academic career, since the scientific-academic field is construed as an epistemologically shared universe and scientists are seen as international professionals ([Vessuri 2013](#)). This puts the same pressure on researchers around the world, who work in very unequal institutional and material environments: applying for grants, applying for fellowships, undergoing constant evaluation, juggling teaching, management and research, and, of course, the pressure to publish (or perish). The spectrum of structures of perception and appreciation, position-taking, demarcation criteria, and the formation of personal and professional identities is closely related to the trajectory of the agent through the scientific-academic field of origin and those with which they come into contact.

At this point, sociological reflections on science can be enriched by a sociolinguistic perspective, and Bourdieu's own considerations on science and language can be integrated. Hence, any scientific field, nowadays thought of as a space of transnational dimensions, where individual and institutional agents endowed with different types and volumes of capital are inserted, can also be seen as a market of linguistic goods where each product (oral or written interventions) will be more or less profitable depending on whether it remains close or deviates from the linguistic norm established as dominant. In the linguistic market, conceived as the space where the products of linguistic practices are evaluated and valued, where linguistic exchanges manifest exchanges of symbolic power, and where power relations between discourse producers and their social groups are validated, calls to order and self-censorship mechanisms operate

according to a dominant norm ([Salö 2015, 2020](#)). However, these structures are not applied to the agent from the outside, but work “from within” through their incorporation, their embodiment in a specific *habitus* ([Salö 2015](#)). In the scientific field, we could think of a *habitus* built along the histories and traditions of each discipline (where each subfield would give itself its own logics and *enjeux*) and the different national and institutional evaluation cultures.

Analyzing the construction and incorporation of a specific scientific and linguistic habitus is particularly relevant in the case of PhD candidates. During the years of study and research leading to the doctorate, “habitus configures in students an idea of their rightful place in the academic community and predisposes them to do what they believe is expected of them” ([Darvin and Norton 2019, 180](#)). In order to forge their identities and voices as legitimate peers in the academic context, these researchers in their early stages of formation develop and internalize scientific knowledge, technical competencies, and discursive practices in a non-linear process of academic socialization ([ibid.](#)). While recognizing and negotiating their position in the field, PhD students acquire the specialized ways of knowing and communicating in their disciplines by bringing into play their previous linguistic resources; however, they do not mechanically reproduce these structures: they both “adopt and adapt” the field’s cognitive and practical preferences, epistemological guidelines, and social norms ([Kaiser 2005](#)) by deploying a range of strategies than can tend to more orthodox or unorthodox trajectories³ through exercising their own agency ([Darvin and Norton 2019](#)).

In this context, without ignoring the geopolitical implications of a near total supremacy of English over at least certain disciplines (among which astronomy is definitely included), as well as the well-documented inequalities that this generates among multilingual scientists from different backgrounds ([Monteiro and Hirano 2020](#); [Hamel 2007](#); [Curry and Lillis 2004](#); among others), my field observations led me to seek a more flexible perspective on language in use. While concepts such as ownership and territorialization contribute to seeing languages as discrete and separate entities, the translanguaging relates to the synergy between languages, the generative and creative aspect of linguistic practices ([Lee and Canagarajah 2018](#)). Furthermore, this approach does not consider languages as homogeneous blocks that a speaker controls, but as a system of specific semiotic resources that can be mobilized in order to produce appropriate and meaningful messages. Some of these resources will belong to one language (according to its traditional conceptualization) and others, to others: resources are the specific accents, linguistic varieties, registers, genres, and modalities that the agents are able to activate in particular communicative situations and social spheres ([Blommaert 2010](#)). From this point of view, people do not speak, for example, “good or bad English,” but rather, throughout their trajectory in the social space and across different fields, they acquire and build a repertoire of semiotic resources that allow them to perform in different situations, such as academic life ([Blommaert and Horner 2017](#)). These resources have a relative value, since they are reevaluated and revalued at each step of the agent’s trajectory. The value and functions that certain

³ In the case of astronomy, an example of an unorthodox trajectory would be a disposition towards public communication of science. We discuss the conditions of possibility for astronomers to put time and effort into these non-research activities in Céspedes and Chiavassa Ferreyra ([2017](#)).

resources are capable of fulfilling change according to the communities of discursive practice and the linguistic markets where an intervention takes place.

Methodological Considerations and Research Context

In 2019, during the months of October, November, and December, I attended six seminars delivered by PhD candidates in astronomy. I was welcome to attend because of contacts established in previous works (see [Céspedes and Chiavassa Ferreyra 2017](#)). These six presentations, as well as the discussions that followed, were recorded (audio only). Also included in the data corpus are two brief interviews held with the director of the institute, and my field notes taken during my attendance to each event, which included informal exchanges with students and researchers before and after each seminar. All participants' quotations from hereon in come from these recordings or my field notes.

The choice to work with the astronomy community owes to the discipline's well-established history in Córdoba. Astronomy was one of the earliest sciences to be institutionalized in Argentina and its development is closely linked to the province of Córdoba (an exhaustive historical review can be found in Minniti and Paolantonio (2009)). Its background makes it a field with a vast academic tradition, marked from its beginnings by contact with researchers from all over the world, and with a permanent dynamism that make it a privileged area of analysis for the social studies of science.

The foundation of the Astronomical Observatory of Córdoba (OAC) in 1871, then under the name of *Observatorio Nacional Argentino*, was the beginning of scientific observational astronomy in the country. Although from the beginning it was intended to be scientifically and institutionally linked to the National University of Córdoba (UNC), it was not until 1954 that the OAC was annexed to the Rectorate of the University. In 1956, at the initiative of prominent Argentinian physicist Enrique Gaviola, the *Instituto de Matemática, Astronomía y Física* (IMAF, Institute of Mathematics, Astronomy, and Physics) was founded within the UNC to supply the personnel needs of the OAC and the Bosque Alegre Astrophysical Station (also inaugurated by Gaviola in 1942). The IMAF would achieve the status of Faculty in 1983, to become the FaMAF. The *Instituto de Astronomía Teórica y Experimental* (IATE, Institute of Theoretical and Experimental Astronomy) was created as a CONICET executive unit in 2006, recovering a research program created by astronomer José Luis Sérsic in 1983, which had been discontinued after his death in 1993.

In 1956, with the creation of the IMAF, the PhD program in astronomy⁴ began, a graduate program currently categorized as Grade A by the National Commission for University Evaluation and Accreditation ([CONEAU 2013](#)). It consists of four elective subjects, a proficiency exam in English, and the doctoral seminars held at the Faculty or the Observatory. During the course of study, the doctoral student must give at least two of these seminars as a lecturer. It is precisely these seminars that are the subject of this article.

⁴ In 1934, the National University of La Plata had become the first higher education institution in Argentina to offer a PhD in astronomy. UNC was the second, and, in 2009, the National University of San Juan was the third. Unsurprisingly, these three universities are closely associated with some of the most relevant astronomical centers in Argentina.

These seminars are not one-off events: they are carefully planned, take place regularly, and involve scientists at different stages of their training. The doctoral seminars are held on a fixed day and time, typically take place in the OAC's Mirta Mosconi Auditorium (a separate structure of the Observatory building, where public communication of science activities are usually held for the general public) and they are communicated on the Observatory's web page, where there is a calendar with the date, title, speaker, and topic of the upcoming seminars.

In contrast, seminars by postdoctoral fellows and researchers are announced on IATE's website, and are held in another auditorium. According to the assessment of a doctoral student, since doctoral seminars need "to convince a committee, for the committee to like it and for the committee to approve it, they tend to be less risky and designed to be more self-conclusive presentations."

Although the main target audience of the seminars is the scientific staff of IATE and OAC (and FaMAF in general), they are not closed to external audiences (such as family members). Likewise, the doctoral seminars are observed by the dissertation supervisor and the doctoral student's advisory committee. The committee does not assign a grade, but credits the delivery of the seminar as part of the follow-up of the work plan and the fulfillment of the course's requirements, and provides its comments and observations. The presentations last approximately half an hour, with a subsequent space for exchange and questions from the advisory committee, and then from the rest of the audience. Altogether, each seminar does not exceed an hour. In addition, it is customary for fellows and researchers to share some coffee in the auditorium hall, while inside the room the exhibitor sets up the projector, laser pointer, microphone and any other necessary equipment. The auditorium has a podium where a computer is placed, and each speaker can choose to stand behind or in front of it, or walk around the space between the first row of seats and the wall where the presentation is projected.

At first glance, the seminars are general evaluation instances circumscribed to the fulfillment of the requirements of a doctoral program within a particular scientific institution. The language of the presentations and following discussion is Spanish. However, they are influenced, as I will show, by phenomena of a higher order that obey the structures of the field of astronomy and that have effects on the variety of semiotic resources displayed by the agents in this communicative situation. I will deal with their analysis in the following sections.

Managing Expectations and Creating Room for Linguistic Innovation

In order to organize the exposition of the main results, this section is divided under two subheadings. The first one deals with aspects related to the transposition of writing conventions onto oral presentations: structure, signposting, titles, and, in more general terms, the influence of evaluation regimes based mainly on article publication. The second one examines the presence of English bits and pieces in discourses predominantly delivered in Spanish, as well as the astronomers' dispositions toward the use of English. The titles of the following two subheadings are quotations transcribed from my field notes, chosen because of their symbolic significance: they encapsulate the content developed in each subsection.

The first objection I can think of that a referee might make is . . .

The first characteristic observed as systematic and recurrent is the schematic and regular structure of the presentations. The speakers ordered their seminars in a way that corresponded almost section by section

with the IMRD writing model: Introduction, Methods, Results, Discussion (Swales 1990). This was very palpable in the organization of the visual presentations that illustrated each seminar. Some were created in Microsoft PowerPoint® and others (most of them) in LaTeX®,⁵ and exported in PDF format for projection. In all cases, the first slides were reserved, as a table of contents, to introduce the order and briefly comment on the contents that would be discussed during the seminar. The space and time allocated to this introduction varied greatly from one speaker to another. As a postdoctoral fellow pointed out, “there are areas that give a lot of importance to contextualizing, others that emphasize methodology or results. It depends on styles.”

On the other hand, the oral use of textual markers also denotes an intention on the part of each speaker (two speakers in different seminars) to guide the addressees throughout the exposition:

From now on I will only show. . .
 . . . we have worked on this, but I will not present it in this seminar.

This is due to a specific style of textual composition and not to the need to adopt a pedagogical position, since there is no need to explain the canonical format of a scientific presentation to their audience, composed of colleagues as or more experienced than themselves. According to Eliseo Verón (1998), understanding seminars as situations of endogenous intradisciplinary communication, where both speaker and addressee are positioned as producers of knowledge, doctoral students must demonstrate, in addition to the progress of their work, their ability to build a cohesive and solid discourse, in accordance with the implicit acceptability standards for this type of peer-to-peer communication. Precisely, seminars are spaces for training in this aspect of legitimate communicative *competence* (I will return to this in next section). In the words of a postdoctoral fellow, “you get to see the diversity of ways of presenting things, and also to choose what you like and what you do not, to know what the others are doing, to know how to communicate, and to see options.”

Similarly, the title of the seminars also seems to obey the criteria usually observed and recommended for the title of written scientific articles: clarity, precision, relevance, referentiality, and syntactic economy. The only seminar that deviated from this linguistic-stylistic norm, entitled “Dusty Roads: Analysis of the Distribution of Dust Associated with Clusters,” introduced an expressive innovation sufficiently striking to elicit comments from the audience before it began (“sounds like a Western”). These remarks were in no way negative, however, the very fact that the title was commented upon suggests that “Dusty Roads” was a sufficiently innovative style marker for the *usual* or expected titles in astronomy. Undoubtedly, these reactions would not have occurred if the author had decided to simply title his talk “Analysis of the Distribution of Dust Associated with Clusters.”

⁵ Free software widely used in the edition of articles, books, posters, etc., in the exact sciences, due to the ease and neatness with which it allows writing mathematical expressions, equations, formulas, and scientific notation. It differs from text processors known as “What You See Is What You Get” (such as Microsoft Word® or Open Office Writer®) in that LaTeX® works on the basis of tags and commands that shape the content of the document.

Furthermore, it was observed how the publication in a peer-reviewed scientific journal appears as a horizon for any research project, even when giving feedback in an oral presentation that described a thesis's work-in-progress, and despite there being no formal obligation for the seminars presented to become a published article. In this sense, the comment of an advisory committee member during one of the seminars, about an aspect of the presentation, was revealing: "the first objection I can think of that a referee might make is . . ." That is, even in a situation of internal communication, marked by orality, one of the evaluation parameters is how the research would perform when presented before reviewers if the work were presented as an article in an indexed scientific journal. And, due to the structural characteristics of the astronomy field, to say "indexed journal" is to say, "indexed journal of international circulation and publication in English." In this regard, Curry and Lillis (2014) posit that, as far as publications are concerned, in recent decades there has been a shift from the signifier "international" to the signifier "English," and together the two terms constitute a naturalized (but by no means natural) indicator of scientific quality.

Can you imagine saying "redshift" in Spanish?

The second characteristic of the discourse produced by the doctoral students in their seminars (and also by the doctoral commissions when offering their comments, as well as by the rest of the colleagues who made remarks) is the naturalized presence of English vocabulary. It should be noted that, when introducing myself to IATE's scientific staff, I always referred to my research topic as being related to "languages" (in general, without mentioning a specific one) used for scientific practice and communication in Latin America. Invariably, my informants began to relate how they read, write and use English. The following comments by four interlocutors arose spontaneously, without any reference to the use of other languages in their everyday scientific work.⁶

The thing about English is . .
 . . it is strange to read it in Spanish because you've always read it in English. . .
 . . in our Spanglish. . .
 Or,
 . . I got used to saying it like that in English. . .

A similar phenomenon is reported in the recent study by Villares (2020), where, despite formulating the questions of her questionnaire on languages in Spanish higher education in a neutral way, the responses spontaneously took English as a synonym for "foreign language."

In my study, the prevalence of English in both speaking and writing was notable in the seminars observed. While Spanish was clearly the dominant language in which each of these communicative situations took place, both speakers and audience members made extensive use of English terms to refer to methodologies and techniques (MAMPOSSt (Modeling Anisotropy and Mass Profiles of Spherical Systems), RedMapper, GoGreen, seeing, timing, stacking), specific stellar catalogs (2MASS, WISE, FIRE), concepts

⁶ In an informal conversation, two doctoral students mentioned traveling to Brazil and Italy for short-term research collaborations. However, Portuguese and Italian were absent from their accounts of these experiences.

(afterglow, redshift, luminosity, transit, median Jeans mass), and objects of study (galaxies, clusters, stars, supernovae, gas disk, dust cloud). Some of the speakers made some clarifications of the terms used, either mentioning the whole terminology when certain acronyms were referred to in English for the first time, or, more rarely, translating them into Spanish. Others did not make any comments at all. Most of the graphs and tables included in the slides were almost entirely in English, either extracted from other works or self-made. It can be inferred, then, that the computer tools for data generation, visualization or analysis are software originally programmed in English and either do not offer a version in other languages or their users simply prefer to run and use them in English.

It is interesting to note how these foreign language terms were immersed in fragments of speech composed mostly in Spanish: “*Podemos llegar a ver estos bumps,*” “*eso te produce un bias en la mediana,*” “ *aunque sea random,*” “*forman parte de las baseline calibrations,*” and “*lo utilizamos como input.*” I even recorded cases of generative appropriation of code-meshed English and Spanish vocabulary ([Canagarajah 2019](#)), which shows a creative and integrated use of diverse semiotic resources beyond the traditional binary linguistic boundaries that would divide one language from another. For example, in the sentence “*Esto es un cúmulo stackeado,*” the English adjective *stacked* is code-meshed with the Spanish suffix *-ado* (used in participle formation). In another case, in a slide with text entirely in Spanish, the construction “*ith componente*” uses the particle *-th*, an abbreviation indicating ordinal numbers in English, to refer to component “*i*” of the study. Moreover, the word order (adjective first) was the only recognizable English language structure in that slide, but the noun (*componente*) was written in Spanish. Due to the regularity of most ordinals in English, formed from the cardinal number plus a suffix (*six-th, seven-th, eight-h, nine-th, ten-th*), *-th* can be used to indicate indefinite ordinals, as in this case. Given “*i*” number of elements, the item number “*i*” can be called, precisely, *ith*. A possible equivalent in Spanish would be to say *iavo* or *iésimo*. Another strategy would be to resort to paraphrasing such as I have elaborated in this explanation: “*el componente i.*”

Finally, it is worth highlighting the phonological aspect, often relegated as an explanatory factor, among the reasons for language choice and switch. In the production of meaningful sounds articulated from the phonatory system, the linguistic aspect is closely intertwined with corporeality. As Bourdieu ([1977, 660](#)) states, “linguistic capital is an embodied capital and [...] language learning is one dimension of the learning of a total body schema which is itself adjusted to a system of objective chances of acceptability.” Thus, disciplining the body to produce oral utterances as accurately as possible is part of a certain body *hexis*⁷ that is incorporated with the linguistic *habitus*. Therefore, the English terms that astronomers integrate into their discourse do not appear unaltered, but phonologically adapted according to the semiotic resources that each of them has in relation to pronunciation. A senior researcher commented: “we say ‘brillo superficial’ in

⁷ In Bourdieu’s theory ([1977](#)), *hexis* refers to the embodied, unconscious dispositions that orient bodily practices and the way of conducting oneself in different social situations. In terms of language use, *hexis* is a marker of social class, manifested, for example, in accents or slang. The concept may be extended to consider certain linguistic markers among Latin American speakers of English whose first language is actually Spanish, and who have acquired their semiotic resources through different personal and professional trajectories.

Spanish because it is difficult for us to say, ‘surface brightness’ in English.” On the other hand, according to the informants, “redshift,” a term that could be considered as phonologically challenging for Spanish speakers, is always “redshift,” never “corrimiento al rojo.”

A researcher at IATE further elaborates:

For me, the classic example is *corrimiento al rojo de la luz*. That’s called “redshift.” The thing is that there are different origins of that *corrimiento al rojo*. If the light is changing its wavelength because the object is moving, maybe you just call it “redshift.” But when the community refers to “redshift,” they precisely mean the movement of light towards red because of the expansion of the universe, not because of the objects’ own movements. What I have just told you is for me a very good example of a word that is a concept in itself. In English, it might be much more difficult, because in English, “redshift” will be used for the objects’ own motion and for the cosmological motion as well. But in Spanish, I think that idea has already been accepted, and in the texts, even if you write them in Spanish and the word “redshift” comes up in English, nobody will complain and nobody will get confused.

From my field notes, I highlight a comparison that I suggested and with which researchers emphatically agreed: translating certain technical terms sounds as unnatural as those old vinyl records that translated the titles of The Beatles’ songs into Spanish.

Discussion of Astronomy Language Conventions

As I have pointed out in this paper, the seminars given by the doctoral students show a transfer of the stylistic conventions of writing into spoken language, including but not limited to the IMRD model, the use of discourse markers as signposts across the presentations, the preference for clear and informative titles, and the influence of evaluation regimes which rely on the publication of academic articles. Indeed, if seminars can be compared to papers in their structure and style, then the advisory committee would serve as the refereeing body.

We should bear in mind that the members of the doctoral advisory committees are astronomers that have a certain trajectory, who work both as thesis supervisor and as evaluator of articles in scientific journals, so their sense of evaluation is marked by this double *habitus*. In previous works, also about the field of astronomy in Córdoba, we have observed that agents have a clear awareness that publications in strategic locations can define a trajectory in science: “‘Those of us who do basic science live to publish,’ ‘Everything counts, but papers are central,’ ‘We only live for papers.’” ([Céspedes and Chiavassa Ferreyra 2017, 100](#)). As Canagarajah ([2006](#)) points out, academic writing is a high-stakes activity, where publication constitutes a fundamental aspect of professional success. This centrality of writing would tend to overlook other forms of interaction that are of equal relevance in the integral process of scientific research and training, such as, precisely, the doctoral seminars described here. This can be seen, for example, in the national evaluation regimes that privilege publications in certain journals over other types of scientific production ([Alperin and Rozemblum 2017](#); [Vasen and Lujano Vilchis 2017](#)). As a consequence, editors and reviewers for international, English language, well-indexed journals end up acting as gatekeepers of linguistic, stylistic and rhetorical acceptability within this disciplinary tradition.

In addition to being a formal requirement for completing the doctoral program, through the seminars, PhD candidates, as early career researchers, not only acquire the skills to make original

contributions to their fields of study, but also incorporate the legitimate style of intradisciplinary scientific communication ([Verón 1998](#)). Therefore, they are relevant instances in the incorporation of the scientific and linguistic *habitus* specific to the discipline (astronomy). In Bourdieu's terms, *habitus* is embodied through practice, *mimesis* (we discussed the prominence of the thesis director as a model for the construction of representations about what it entails to establish oneself as a scientific researcher and as an astronomer in [Céspedes and Chiavassa Ferreyra 2017](#)) and, above all, exposure to the structuring structures of the field throughout the agent's trajectory and the process of academic socialization.

In this sense, as mentioned in the first section, it is useful to follow Bourdieu ([1977](#)) in conceptualizing social fields (in this case, the scientific field) as a linguistic market where agents place their discursive investments in the form of carefully forged symbolic products. For Bourdieu, acceptability in relation to the legitimate linguistic norm is not restricted to grammaticality. From this point of view, seminars acquire another layer of relevance. It is about doctoral students providing their peers (other doctoral students) with examples of scientific discourse through which to model their own expressive skills. Likewise, depending on the feedback (positive or negative) received from the advisory committees, they construct a practical-linguistic understanding based on the perceived adherence to or deviation from the legitimate forms of scientific discourse, which includes the anticipation of benefits or sanctions. Seminars, then, serve as instances where early career researchers can test their growing scientific and linguistic competence in a familiar and safe environment, but with enough at stake to influence the perception of the value placed by peers on linguistic interventions and on the resources available to the author/speaker. At the same time, due to the international orientation of astronomy, doctoral students begin to be exposed to the broader evaluation logics that prevail in the field, embodied in the *habitus* of researchers with more experience who make up the doctoral advisory committees. In the current context of globalization of science, local interactions such as these must be considered as embedded in translocal scales of time and space ([Canagarajah 2018](#)).

Although astronomy may indeed be published overwhelmingly in English, from a translocal perspective, linguistic uses are more complex. English does not fully banish local languages from scientific practice, but enters the speakers' repertoire as a resource to fulfill certain pragmatic and metapragmatic functions ([Blommaert 2003](#)). Moreover, English is not incorporated into the discourse randomly; the cases described in this paper reveal that a pragmatic criterion of linguistic, communicative and cognitive economy prevails among researchers. Linguistic, because the terms are reworked by means of translingual practices to bring them phonetically and morphologically closer to certain forms of Spanish (in fact, as we have seen, the phonetic aspect may constitute, to a certain extent, an explanatory factor in itself of the linguistic choice when faced with the availability of the same expression in Spanish and in English, especially in spoken language). Communicative, because a specific technical jargon is incorporated, understood, and shared by the same community of discursive practice. Cognitive, because the use of English terms often represents a mental shortcut. Far from representing a complication, in the agents' perceptions, the integrated use of English in Spanish-speaking sentences represents a simplification of the message, both for production and reception: the ubiquity of certain terms and constructions in English makes them part of the repertoire of semi-linguistic resources commonly used in the scientific practice of astronomers.

However, this does not mean that the construction of such statements is a simple operation. On the contrary, the translingual practices involved imply a fine competence in Bourdieu's sense, that is, the

mastery both of the abilities to produce grammatically correct messages, and also of the global sense of acceptability of a given intervention in a market of linguistic goods that one must learn to read based on the sense of one's own position and the value of one's own linguistic resources, as well as those of the others. This competence, as part of the *habitus*, is acquired throughout trajectory and through practice, at the intersection between the agent (endowed with various forms and volumes of capital) and the market/field (structured in a particular way and situated in a particular time and place).

Conclusions

Considering that the language of science is merely the language in which its articles are published is a perspective that reduces the whole process of scientific training and research to its final product. Despite the undisputed supremacy of English in publications in the field, the notion that astronomy exists and is referred to only in English, even in non-predominantly English-speaking contexts, needs to be nuanced. The choice of expressions in one language or another seems to depend on the type and volume of linguistic resources that each agent has at their disposal in dynamic relation to the market conditions established in each particular communicative situation, and the mediating intervention of the linguistic and scientific *habitus*. In the case under analysis, this linguistic practical sense co-constructed among agents intersects with the broader scales on which internationalized scientific activity takes place.

It is interesting to note that the approach adopted in this work recognizes the agency of listeners and readers as well as that of speakers and authors. In other words, the negotiation and creation of meaning through the available linguistic, semiotic, and rhetorical resources takes place among all the participants in a translingual communicative situation. Within a particular discourse community, this shapes a joint and shared sense of familiarity in the use of English or Spanish for certain expressions, while the opposite is judged as strange, even on a bodily level, with respect to how an utterance produced by one's own body, by one's own voice, sounds and feels in one or another language.

In conclusion, this article suggests a line of research that has been scarcely explored in Latin America. Future work could deepen the findings presented here, especially by comparing linguistic practices and representations of language in use within the scientific field among scholars in different stages of their academic careers, among different disciplines, or even among different countries in the region. One aspect that has been superficially mentioned earlier, but on which it would be worthwhile to raise new questions, is the role of IT tools as the backbone of scientific practice (in this case, astronomy, both theoretical and observational) and the linguistic uses by the researchers who employ these programs and applications. For example, changes in the writing process when using systems such as LaTeX® instead of the usual word processors could be analyzed. Examining the international circulation of the most widely used software, as well as the origin of these programs, whether they are open or proprietary, the languages in which they are available, the resources required to acquire and run them, and the relationship of users with these tools would be a way to inquire into the effects of artifacts and non-human agents involved in scientific practice, and their role in the establishment of patterns, paradigms and shared codes at the linguistic and epistemic level. The systematic study of scientists' linguistic uses, choices and practices constitutes a privileged approach to the underlying logics of scientific activity. Thus, a greater integration between applied sociolinguistics and the social studies of science and technology could be very fruitful.

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