

# Spanish researchers' perceived difficulty writing research articles for English-medium journals: the impact of proficiency in English versus publication experience

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## Abstract

Previous quantitative studies suggest that the burden researchers who use English as an additional language perceive when writing research articles (RAs) for publication in English (as L2) is 24% greater than the burden they perceive when they write RAs for publication in their L1. It remains unclear precisely which aspects of research article (RA) writing in English present these writers with the greatest challenge and just why they perceive this increase in difficulty. A structured questionnaire comprising thirty-seven questions about researchers' publication experiences in scientific journals in English and in Spanish was designed and sent out to all (n = 8,794) Spanish postdoctoral researchers at one research-only institution and four universities in Spain, yielding responses from 1,717 researchers. Our first results show that the discussion is the section that is perceived as more difficult to write for English-medium journals, across the four broad knowledge areas in a way that cannot be fully explained by their lower level of proficiency in English (as L2). This article proposes the rhetorical transfer hypothesis as a possible explanation for their additional difficulty. Our results also reveal that their increased perceived difficulty writing RA discussions in English (as L2) does not decrease noticeably until Spanish researchers report high or very high levels of proficiency in English (as L2) for academic or general purposes or have published on average at least 37 RAs as corresponding author in English-medium journals over the last ten years. Implications for English for Academic Purposes (EAP) research and pedagogy are discussed.

**Keywords:** research article, academic writing, difficulty, needs analysis, survey studies.

## Resumen

### *La dificultad percibida por los investigadores españoles al escribir artículos de investigación para revistas en inglés: los efectos del nivel de inglés y de la experiencia de publicación*

Estudios cuantitativos previos sugieren que escribir artículos de investigación (RAs) en inglés (como L2) supone una dificultad añadida del 24% a los investigadores cuya primera lengua no es el inglés con respecto a escribirlos en su primera lengua (L1). Sin embargo, se desconoce qué aspectos de los RAs les resultan más difíciles de escribir en inglés (como L2) y cuáles son precisamente las causas de dicha dificultad añadida. Con este fin, se envió un cuestionario estructurado a 8.794 investigadores españoles doctores afiliados a cinco instituciones españolas, una de investigación y cuatro universidades, obteniéndose respuestas por parte de 1.717 investigadores. El cuestionario contenía 37 preguntas sobre sus experiencias de publicación en revistas científicas en inglés y en castellano. Nuestros primeros resultados indican que la discusión es el apartado del RA que se percibe como más difícil de escribir en revistas en inglés en todas las áreas de conocimiento sin que el menor nivel de competencia lingüística lo explique completamente. El artículo propone la hipótesis de la transferencia retórica como posible explicación de dicha dificultad añadida. Los resultados también muestran que la percepción de dificultad añadida no se reduce de forma apreciable hasta que los investigadores afirman tener un nivel alto, o superior, de competencia en inglés (como L2) para fines académicos o generales o han publicado por término medio al menos 37 RAs como autores principales en revistas en inglés en los últimos diez años. Se extraen implicaciones para la docencia y la investigación en inglés con fines académicos (IFA).

**Palabras clave:** artículo de investigación, escritura académica, dificultad, análisis de necesidades, estudios mediante encuestas.

## Introduction

In recent decades, multilingual researchers from many countries have been gradually moving towards publishing their research findings in English (Lillis & Curry, 2010). As has been widely discussed in the literature, these researchers frequently face the additional burden of not having English as

their first language (L1 henceforth), which reduces their chances of publication success (Flowerdew, 1999; Lillis & Curry, 2006; Hanauer & Englander, 2011). Spanish researchers are no exception (Rey et al., 1998; Curry & Lillis 2004; Gómez et al., 2006; Pérez-Llantada et al., 2010) and feel, in fact, at a linguistic disadvantage with regard to other writers for whom English is an L1 (Ferguson, Pérez-Llantada & Plo, 2011). Although their concerns have been voiced infrequently until very recently (Clavero, 2011), a clear indication that Spanish researchers are facing additional challenges is reflected in their plea for specialised training in English for research publication purposes (ERPP) in all scientific areas (see Moreno, 2011, for a list of courses). These observations contrast with Curry and Lillis' (2004) account of the situation earlier this century, when researchers working in contexts like Spain were “unlikely to attend formal classes in English academic writing, if indeed such classes are available” (Curry & Lillis, 2004: 682). They are, however, consistent with Fernández Polo and Cal Varela's (2009) more recent survey findings at the University of Santiago de Compostela. In their study at least 32.4% of their respondents said they would choose courses in written scientific English as one of three preferred ways of catering for their English language learning needs.

Given these circumstances, a number of applied linguists have called for a collective reflection on the most appropriate means of providing training in ERPP for researchers who use English as an additional language (EAL) (Swales, 2002; Harwood & Hadley, 2004; Moreno, 2010; Pérez-Llantada et al., 2010). Moreno (2010), for instance, emphasises the importance of taking into account their specific recurrent difficulties with academic writing and the reasons for these difficulties. However, although English for academic purposes research has provided descriptions of academic texts that are both rich and increasingly accurate (Hyland & Salager-Meyer, 2008), few studies have focused on the actual writing difficulties Spanish researchers face (St John, 1987; Curry & Lillis, 2004; Burgess, Fumero Pérez & Díaz Galán, 2005; Moreno, 2012). This, together with the small scale nature of the few studies that do exist and their lack of rigorous procedures for selecting informants, means that there is insufficient systematic information on Spanish researchers' writing difficulties (including causes) relative to their level of proficiency and publication experience. Without this, appropriate training programmes cannot be developed.

Recent survey studies have taken larger scale quantitative approaches to charting the difficulties that multilingual researchers confront. For instance,

Duszak and Lewkowicz (2008) report that 59% of the 99 researchers answering their questionnaire had difficulties with the language and 18% with writing academic texts. In their study, Hanauer and Englander (2011) suggest that the increased burden perceived by a sample of 148 Spanish-speaking Mexican researchers in writing RAs for publication in English-medium journals is 24% greater than that they experienced when writing for Spanish-medium journals. However, while they attribute this increased burden to language, it is difficult to assess the significance of their finding for EAP research and pedagogy since their study controls for neither the researchers' level of proficiency in English (as L2) nor their research publication experience. None of these studies, furthermore, examines the relative difficulty the various sections of the research article (RA) present for researchers, though Flowerdew (1999), drawing on 26 interviews with Chinese researchers, has already shown that the degree of challenge varies.

There are, then, a number of questions to which clearer answers are required before ERPP teaching materials for Spanish researchers can be designed. In particular,

1. Which sections of the RA are implicated in the perceived increased difficulty in writing RAs in English (as L2) as opposed to Spanish (as L1)?
2. Does the perception of increased difficulty writing these sections of the RA in English (as L2) vary across knowledge areas?
3. What is the relative impact of the researchers' writing proficiency in English (as L2) versus their RA publication experience on their perception of difficulty writing the section of the RA they find most challenging to write in English?

To answer these questions, this study has taken a large-scale comparative survey approach, probing Spanish researchers self-reported perceptions of difficulty writing RAs in English (as L2) as opposed to Spanish (as L1). The survey is part of a larger multiple-methodology three-phase project carried out by the ENEIDA (Spanish team for Intercultural Studies on Academic Discourse) research group at one research-only institution and four universities in Spain. One of its ultimate aims is to develop a comprehensive picture of the writing difficulties, both self-reported and real, that Spanish researchers face when writing manuscripts for English-medium scientific journals (see Moreno et al., 2011). Drawing on Moreno's (Forthcoming

2012) notion of intercultural rhetoric accommodation, we distinguish between perceived difficulties and actual writing obstacles in English (WOEs). WOEes are defined as those writing problems encountered in the process of RA publication making it necessary for multilingual authors to revise their manuscripts so as to conform to the expectations of English-medium scientific journals. We also aim to offer Spanish researchers pedagogical solutions to their real WOEes grounded in sound research. The present paper, however, focuses on their perceived difficulties writing RAs in English (as L2) relative to writing them in Spanish (as L1), and thus represents only a part of the larger picture needed to inform the design of future studies of their actual WOEes and of pedagogical resources. The following section outlines the major theoretical assumptions underlying the design of a number of items in our initial survey relevant to the present study and to the way the population was defined.

## Theoretical framework

Our initial survey acknowledged the fact that the RA is not a monolithic genre (Swales, 2004). As many studies have shown, each section of the RA has a different linguistic and rhetorical configuration, which may make some sections more difficult to write than others. In fact, writing introduction/literature reviews and discussions/conclusions in English is known to be especially challenging for multilingual researchers, so much so, in fact, that it is seen as “potentially critical to the acceptance or rejection of their articles, whatever the merits of their actual findings might be” (Flowerdew, 1999: 259). Our survey methodology also reflects the view that the most appropriate means of assessing this difficulty is through comparison with the difficulty felt by EAL researchers writing these sections in their L1. Thus, our survey charts researchers’ perceived difficulties writing each section of the RA in English (as L2) relative to their writing them in Spanish (as L1).

In addition, our survey recognised that the RA is not a stable genre (Salager-Meyer, 1999). For this reason, it focused on the publication experiences and difficulties of Spanish researchers over the last decade, the period in which their ERPP training needs have increased in number and specificity. Our research also acknowledged the expected correlation between “the nature of knowledge domains and the nature of the

associated disciplinary cultures” (Becher, 1994: 153) and assumed that academic writing features, communicative skills and discourse practices would vary across disciplines (Hyland, 2000). Likewise, since discipline is regarded as a key factor in the design of relevant pedagogical resources (Dudley-Evans & St John, 1998: 51), data on difficulties as a function of disciplinary area were also obtained.

We also took into account various factors that have been proposed in the literature to explain the difficulties faced by multilingual researchers in the process of publication of RAs in English-medium journals. One such factor is familiarity with academic discipline. As some applied linguists have argued, difficulty has more to do with having learned or failed to learn the disciplinary conventions of scientific writing than with using the language itself (Swales, 2004). Thus, to ensure that participants were well versed in the conventions of scientific writing in their disciplines, our survey targeted only Spanish postdoctoral researchers and included finer indicators of familiarity with the RA genre in question. Other researchers have argued that the factor that plays a major role, not only in a researcher’s reduced productivity (see Man et al., 2004), but also in the perception of increased difficulty (Flowerdew, 1999; Hanauer & Englander, 2011) is language proficiency. For this reason, our survey included operationalizations of this factor too.

A third issue frequently debated in the literature is the influence of cultural factors in writing in English (as L2). As Moreno (2008) explains, specific forms of socialisation into writing values, norms and practices characterising given educational and socio-cultural contexts interact in complex ways with the effects of communicating through a given language code. In EAP research, the suggestion has also been made that a still uncertain number of rhetorical and stylistic habits that researchers have learned, or simply acquired, in the process of socialisation into their disciplinary cultures in their L1 are likely to be transferred unconsciously to their writing in ERPP as an L2 (Mauranen, 1993; Moreno, 1998; Flowerdew, 1999). This is especially likely in those academic fields in which the effects of globalisation in scientific communication have not yet had enough time to filter through. They are perhaps even more patent in settings, like Spain, where English is used as a foreign as opposed to a second language (Graddol, 1997).

The rhetorical transfer hypothesis rests on the well-known Contrastive Rhetoric hypothesis (CR) (Kaplan, 1996; Connor, 2004), whereby (academic)

writers from different cultural and language backgrounds have distinct preferences for articulating messages which share a similar purpose. This hypothesis has recently been extensively explored in relation to Spanish researchers presenting their research results in Spanish-medium academic journals in comparison to Anglo-American researchers writing for English-medium academic journals (Moreno, 2011, for a review of studies). For example, Spanish researchers writing in Spanish (as L1) for business management journals have been reported to omit Move 2 (Swales, 2004), the rhetorical move whereby authors situate their current research in terms of its significance in the field in RA introductions, more frequently than North-American researchers writing in English (as L1) in the same field (Mur Dueñas, 2007). In our view, the absence of an evaluative writing move in the rhetorical structure of RA introductions may be related to the ways in which Spanish researchers have tended to be socialised into their corresponding disciplinary communities of practice in Castilian-Spanish (henceforth Spanish).

Our survey, therefore, ensured that our participants only included Spanish-speaking researchers who had been socialised in Spanish in a Spanish educational context. Thus the population for the present survey is defined as those Spanish-speaking postdoctoral researchers who have received most of their secondary and pre-doctoral education in Spain and in Spanish (henceforth Spanish researchers). Given that this project was one component of a larger study to be carried out in the five institutions participating in the project, we decided to focus on the population of Spanish researchers working for these institutions. In April 2010, we applied for the e-mail addresses of all the staff with doctorates at these institutions, obtaining a population of 8,794 postdoctoral researchers.

## Method

This section outlines the methodology used to design the survey items intended to answer the research questions posed in the introduction. It also briefly describes the procedures used for validating the questionnaire and implementing the survey. Finally, it provides an overall characterization of the valid sample of participants (for fuller details of this methodology, see Moreno et al., 2011).

## Interviews

Structured face-to-face interviews (1.5 hours long) were conducted in Spanish at three of the institutions with 24 informants who represented a good cross-section in terms of gender, researcher seniority and knowledge area. The aim of these interviews was to validate the relevance of further phases of the project, to identify or confirm relevant variables for inclusion in the survey, and to find the most appropriate register/language for communication with our informants through an online questionnaire. The recorded (with permission) interviews were content analysed to help develop the survey. From our informants' answers, we were able to confirm that training in ERPP was considered to be highly relevant in most fields. In contrast, the need for training in Spanish for research publication purposes was only suggested in a few cases.

## Tools

Following these interviews, we designed a structured online questionnaire (our main tool) comprising thirty-seven questions phrased to avoid leading participants to answer in specific ways and to avoid ambiguities. The questionnaire was divided into several sections that included:

- 1) personal, professional, demographic, academic and language background;
- 2) self-reported level of competence in the use of Spanish (as L1) and English (as L2);
- 3) motivations, feelings, views, attitudes toward publishing in English versus Spanish, and academic journals preferred;
- 4) past experience and difficulties with publishing RAs;
- 5) current strategies for writing RAs for English-medium journals; and
- 6) RA writing learning strategies in these two languages, as well as future needs for ERPP training.

The information thus collected would allow us to carry out more complete needs analyses (Dudley-Evans & St. John, 1998) of specific groups of informants, as well as in-depth analyses of specific factors affecting writing for publication purposes of EAL writers, such as the present one.

Once we had a clean draft, our questionnaire was converted into an online format by means of the Limesurvey application. It was then hosted on a server to be accessible by means of a password. A covering letter was drafted to announce the survey explaining who we were and our project aims and to ask for recipients' cooperation in completing the online questionnaire. Both documents were written in Spanish. The questions (translated from Spanish and contained in the Appendix to this paper) were posed in the survey to illuminate the particular issues under consideration in the present study. Original numbering of the items in the questionnaire has been kept.

Question no. 25 (Q25) was designed to answer research question 1 in our study. As can be seen from its layout in the Appendix, instead of measuring perceived increased difficulty in relation to writing an RA as a whole (as in Hanauer & Englander, 2011), our survey measured perceived difficulty in relation to the various sections of an RA and to the documentation involved in the process of RA publication in Spanish (as L1) and in English (as L2). We provided answers on a five-point Likert scale with an additional option for those who did not consider each section or document applicable to their individual circumstances.

Question no. 9 (Q9) uses a nominal scale to obtain answers for research question 2 on researchers' perceptions of difficulty writing RA sections or documents across the disciplinary areas represented in our sample. As our interviews had shown, although there is a need for revision of many UNESCO codes at the lowest levels of delicacy, they allowed most informants to classify themselves down to the second digit level, that is, at the level of disciplinary area (e.g. life sciences). As the UNESCO system is widely used, this classification of disciplinary areas opened up the possibility of future comparisons with researchers from other national contexts.

Question no. 10 (Q10) and question no. 11 (Q11) were constructed to answer research question 3 on the relative impact of writing proficiency in English (as L2) on Spanish researchers' perception of increased difficulty when writing RAs in English. Answers were provided on a five-point Likert scale. As previous studies have suggested, self-reported measures of proficiency correlate well with "objective" measures (Gardner, 1985). Moreover, our interviewees had no difficulty plotting their language proficiency on a five-point (very low to very high) scale. They also reported greater confidence in their performance in English for academic purposes than for general purposes and believed that their reading was better than

their writing and their spoken interaction in English. Our survey thus includes an important innovation by operationalizing Spanish researchers' perceived proficiency level according to: a) communication purpose (general versus academic) b) language (Spanish versus English); and c) language skill (which we glossed with examples to increase the reliability of informants' answers). This procedure yielded four categories: Spanish for general purposes (SGP), English for general purposes (EGP), Spanish for academic purposes (SAP) and English for academic purposes (EAP). It allowed us to better assess informants' level of proficiency in the variables that interested us most, namely EGP and EAP writing.

Finally, question no. 12 (Q12), using a ratio scale, also provided answers to question 3 on the relative impact of informants' level of research publication experience. In order to operationalize this factor, we used the number of RAs published as corresponding author as a direct indicator of their research publication experience, and of their probable familiarity with the conventions of RA writing in their disciplines both in Spanish and in English writing cultures. From our interviews, we gathered that corresponding authors in most fields would generally be in a better position than other co-authors to report on the writing difficulties involved in the process of RA publication.

### **Procedures for validating the questionnaire and implementing the survey**

The online questionnaire was first validated with experts (both a selection of our interviewees and Phase 1 team members other than the authors) and then with a random pilot sample of 200 informants from the eligible population at the five selected Spanish institutions. After minor revision, it was administered to the entire population of staff with doctorates ( $n = 8,794$ ) through the covering letter sent by e-mail. After two reminders, the survey was closed on 15th December 2010. The information retrieved was kept in a database called the ENEIDA Database.

### **Participants**

Our survey yielded responses from 1,717 Spanish postdoctoral researchers. Of these, 1,454 (84.7%) met the L1 and educational background criteria we had established; 57.4% came from the research-only institution and 42.6% from the four universities. These varied in size, including one large, one

medium-sized and two small universities, one of which was bilingual (Spanish and Catalan). Almost two thirds of the sample (63.6%) were male, while over one third (36.4%) were female. Their mean age was 46.3 (SD = 8.8) and their mean degree of seniority was 16.2 (SD = 9.5) post-doctoral years. In terms of their academic status, 60.6% (n = 881) of the participants were permanent non-promoted staff, 31.5% (n = 458) were permanent promoted staff, and 7.9% (n = 115) were non-permanent staff.

The analyses revealed that only 2% (n = 34) of the respondents reported not having published an article as corresponding author over the preceding ten years. Of the rest, 52.3% (n = 742) published in both languages, 38.2% (n = 542) published only in English and 9.6% (n = 36) published only in Spanish. The average number of articles published as corresponding author over the preceding ten years was 6.1 in Spanish and 16.3 in English but the ranges were very wide (0-100 for Spanish; 0-200 for English). It is also noteworthy that 90.1% (n = 1,279) of the informants in the sample reported acting as peer reviewers for at least one journal, principally for English-medium journals. This suggests that most of the informants in our sample are fully-fledged researchers in their fields, who can be assumed to be capable of providing highly reliable information on their perceived difficulties in the RA publication process.

The researchers came from the following disciplinary areas ordered by frequency (from higher to lower number of participants): Life Sciences, Technological Sciences, Chemistry, Physics, Agricultural Sciences, Earth and Space Sciences, History, Medical Sciences, Economics, Mathematics, Linguistics, Psychology, Pedagogy, Arts and Humanities, Law, Astronomy and Astrophysics, Sociology, Geography, Political Sciences, Philosophy, Anthropology, Demography, Logics and Ethics. In the present study, we collapsed the 24 resulting disciplinary areas into four knowledge areas (Natural and Exact Sciences, Technological Sciences, Arts and Humanities and Social Sciences). The result is that over half of the sample (56.2%) come from the Natural and Exact Sciences, 16.9% come from the Technological Sciences, 16.9% come from the Social Sciences, 16.3% come from the Arts and Humanities and 2.5% remain unclassified (having classified themselves into three or more disciplinary areas). Descriptive data in relation to most variables in the survey can be seen in Moreno et al. (2011).

## Results and Discussion

In order to address the particular issues of the present study, this section presents the analyses of the responses to the survey items previously stated:

1. Which sections of the RA are implicated in the perceived increased difficulty in writing RAs in English (as L2) as opposed to Spanish (as L1)?

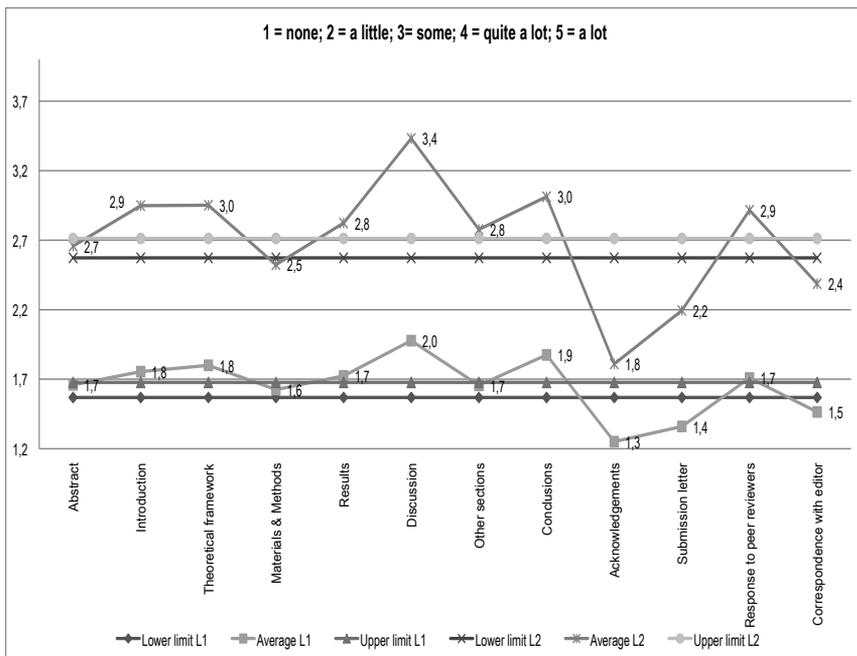
To ensure that participants were in a position to compare their perceived difficulty writing RAs in English (as L2) as opposed to Spanish (as L1), for the current study we selected only those who had published at least one RA as corresponding author both in English and in Spanish. Thus, the initial sample of 1,454 valid participants in our survey was reduced to 742 (52.3%). Table 1 shows the means and standard deviations for informants' perception of the difficulty writing RAs in Spanish (as L1) and in English (as L2). In order to determine whether the means for this paired sample were systematically different, we applied the Student's *t*-test, adjusted using the Bonferroni correction. Values in the same row not sharing the same subscript (a or b) are significantly different at  $p < 0.05$  in the two-sided test of equality for column means. We also added a D-score which calculates the percentage of increased difficulty, following Hanauer and Englander (2011), in order to be able to compare results.

(n = 742) Q25. RA article section or publication-related document	(1 = none; 2 = a little; 3 = some; 4 = quite a lot; 5 = a lot)		
	Spanish (as L1) Mean (SD)	English (as L2) Mean (SD)	Difference D-score (%)
Abstract	1.66 <sub>b</sub> (0.94)	2.66 <sub>a</sub> (1.17)	20.0%
Introduction	1.75 <sub>b</sub> (0.94)	2.95 <sub>a</sub> (1.18)	24.0%
Theoretical framework	1.80 <sub>b</sub> (0.94)	2.95 <sub>a</sub> (1.19)	23.0%
Materials & Methods	1.63 <sub>b</sub> (0.85)	2.52 <sub>a</sub> (1.18)	17.8%
Results	1.72 <sub>b</sub> (0.90)	2.82 <sub>a</sub> (1.17)	22.0%
Discussion	1.98 <sub>b</sub> (1.09)	3.43 <sub>a</sub> (1.20)	29.0%
Other sections	1.66 <sub>b</sub> (0.88)	2.78 <sub>a</sub> (1.22)	22.4%
Conclusions	1.87 <sub>b</sub> (1.10)	3.01 <sub>a</sub> (1.26)	22.8%
Acknowledgements	1.25 <sub>b</sub> (0.59)	1.81 <sub>a</sub> (1.06)	11.2%
Submission letter	1.36 <sub>b</sub> (0.70)	2.19 <sub>a</sub> (1.21)	16.6%
Response to peer reviewers	1.71 <sub>b</sub> (0.98)	2.92 <sub>a</sub> (1.25)	24.2%
Correspondence with Editor	1.46 <sub>b</sub> (0.81)	2.39 <sub>a</sub> (1.20)	18.6%

Table 1. Difficulty experienced in writing the various sections of RAs and publication-related documentation in Spanish (as L1) and English (as L2).

As Table 1 shows, Spanish researchers' perceived difficulty writing all the sections in English (as L2) is consistently and statistically significantly

higher than the difficulty experienced writing each comparable section in Spanish (as L1), as might be expected. The average percentage of increased difficulty writing all the sections as a whole is 21%, this being slightly lower than, but comparable to, the percentage arrived at by Hanauer and Englander (2011) regarding the RA as one whole block (24%). In order to assess which sections were perceived as relatively more difficult to write within each language, we also calculated the confidence interval for the means of all sections in each language with a confidence level of 95% (see Figure 1).



Language	Means (all items)	Upper limit of the confidence interval	Lower limit of the interval confidence	Interval confidence level
English L2	2.64	2.71	2.57	95%
Spanish L1	1.62	1.68	1.57	95%

Figure 1. Spanish researchers' perceived difficulty writing RA sections or publication-related documents in English (as L2) versus Spanish (as L1).

As can be seen in Figure 1, the degree of perceived difficulty of each comparable RA section across the two languages is very similar relative to other RA sections within the same language, although it is always

significantly greater in English (as L2), as already demonstrated. The sections situated on the peaks, that is those lying outside the confidence interval, are those that show statistically significant differences from a greater number of other sections in the same language. Those sections whose means are above the confidence interval can be said to cause the greatest difficulty for Spanish researchers when writing RAs in English (as L2). They include, in order of difficulty, the Discussion, the Conclusion, the Introduction and the Theoretical framework, the Response to peer reviewers, the Results and Other sections. Due to their position in the graph, the Discussion and the Conclusion can be said to be statistically significantly different to the other most difficult RA sections. Furthermore, the Discussion is the only section whose mean is consistently statistically significantly different to the means of the other most difficult RA sections.

2. Does the perception of increased difficulty writing these sections of the RA in English (as L2) vary across knowledge areas?

Table 2 shows the means and standard deviations for our informants' perception of the difficulty they felt writing RA sections and publication-related documents in English (as L2) across the four knowledge areas. The right-hand column (Contrast) shows the result of our comparison. In order to determine whether the means for these four independent samples were systematically different, we also applied the Student's t-test, adjusted using the Bonferroni correction.

As Table 2 shows, not all sections are perceived as equally difficult for Spanish researchers across the four knowledge areas. For instance, writing the materials and methods sections is on average perceived as more difficult in the Social Sciences and in the Arts and Humanities than in the Natural and Exact Sciences and the Technological Sciences. Also, writing abstracts is perceived as more difficult in the Social Sciences than in the Arts and Humanities. In our view, this kind of information will serve to prioritize the design of relevant ERPP training resources addressed to Spanish researchers in particular knowledge areas. As can be observed, writing the discussion section is considered as the most difficult section for all participants in our sample, since the means for this section are on average systematically higher than the means for the other sections or documents across all knowledge areas. This suggests that resources to train Spanish researchers to write discussion sections for English-medium journals in all knowledge areas will be especially relevant.

(n = 742) Q25. RA section and document	(1 = none; 2 = a little; 3= some; 4 = quite a lot; 5 = a lot) Mean (SD)				Contrast
	Natural and exact sciences (NS)	Tech. sciences (TS)	Arts and humanities (AH)	Social sciences (SS)	
Abstract	2.62 <sub>a,b</sub> (1.16)	2.77 <sub>a,b</sub> (1.09)	2.37 <sub>a</sub> (1.11)	2.85 <sub>b</sub> (1.24)	SS > AH
Introduction	2.81 <sub>a</sub> (1.15)	2.98 <sub>a,b</sub> (1.06)	2.79 <sub>a</sub> (1.19)	3.33 <sub>c</sub> (1.20)	SS > (NS, AH)
Theoretical framework	2.70 <sub>a</sub> (1.14)	2.89 <sub>a</sub> (1.08)	3.11 <sub>a,b</sub> (1.24)	3.51 <sub>b</sub> (1.21)	SS > (NS,TS)
Materials & Methods	2.21 <sub>a</sub> (1.06)	2.37 <sub>a</sub> (1.15)	2.99 <sub>b</sub> (1.22)	3.12 <sub>b</sub> (1.17)	(SS,AH) > (NS,TS)
Results	2.62 <sub>a</sub> (1.11)	2.85 <sub>a</sub> (1.11)	2.93 <sub>a,b</sub> (1.25)	3.27 <sub>b</sub> (1.16)	SS > (NS,TS)
Discussion	3.36 <sub>a</sub> (1.21)	3.32 <sub>a</sub> (1.09)	3.19 <sub>a</sub> (1.22)	3.79 <sub>c</sub> (1.18)	SS > (NS,TS,AH)
Other sections	2.51 <sub>a</sub> (1.15)	2.73 <sub>a,b</sub> (1.09)	3.06 <sub>b,c</sub> (1.23)	3.28 <sub>b</sub> (1.25)	SS > (NS,TS) AH > NS
Conclusions	2.86 <sub>a</sub> (1.25)	2.83 <sub>a</sub> (1.19)	2.93 <sub>a</sub> (1.18)	3.55 <sub>b</sub> (1.22)	SS > (NS,TS,AH)
Acknowledgements	1.70 <sub>a</sub> (1.01)	1.76 <sub>a,b</sub> (0.98)	2.00 <sub>a,b</sub> (1.02)	2.05 <sub>b</sub> (1.23)	SS > NS
Submission letter	2.12 <sub>a</sub> (1.19)	2.16 <sub>a</sub> (1.18)	2.24 <sub>a</sub> (1.08)	2.36 <sub>a</sub> (1.27)	None
Response to peer reviewers	2.86 <sub>a</sub> (1.25)	2.97 <sub>a,b</sub> (1.19)	2.44 <sub>a</sub> (1.09)	3.23 <sub>b</sub> (1.26)	SS > (NS,AH)
Correspondence with editor	2.28 <sub>a</sub> (1.17)	2.41 <sub>a,b</sub> (1.18)	2.19 <sub>a,b</sub> (1.03)	2.66 <sub>a</sub> (1.28)	SS > NS

Table 2. Perceived difficulty writing the various sections of RAs and publication-related documents in English (as L2) by knowledge area.

One reason for the discussion section being perceived as more difficult for Spanish researchers to write in English (as L2) might well be their lower level of proficiency in English (as L2), as suggested by Hanauer and Englander (2011). In fact, our study hypothesises that the greater the level of proficiency in English (as L2), the lower the researchers' perception of difficulty writing discussions in English. However, as Table 1 demonstrates, the discussion stands out as being 8% more difficult for Spanish researchers to write in English (as L2) (29%) than the rest of the RA sections as a whole (21%), relative to Spanish (as L1). Since the researchers' level of proficiency in English (L2) is likely to have similar implications for all sections of the RA, it would appear that a factor other than their proficiency level in English must be at work here if we are to account for this extra increase in their perception of the difficulty involved. Also, since the informants in our subsample have published at least one RA in each language, the disciplinary factor (Swales, 2004) can be discarded as a potential explanation for our results. In our view, a plausible hypothesis to consider is the transfer of the

researchers' L1 critical attitude in research publication contexts (Moreno, 2010), for the following reasons.

Introductions and discussions have been identified by researchers in academic writing in English as those RA sections where readers need to be persuaded that the research is “sound, significant, and worthy of publication” (Flowerdew, 1999: 259). As Swales and Feak (2004: 112) also explain, discussions or “data commentaries,” as they call them, “are exercises in positioning yourself”. Some common purposes of discussion sections these authors mention include the following: assessing standard theory, common beliefs, or general practice in light of the given data; comparing and evaluating different data sets; and discussing the implications of the data, among others. All of these purposes involve using critical thinking strategies and the use of subtle evaluative text resources.

On the other hand, previous studies of academic discourse have demonstrated that Spanish researchers tend to be less critical when evaluating the literature in their field in academic public settings than expected. For instance, in their study of the changes made to the initial version of an RA submitted by a full professor to an English-medium journal in educational psychology for publication, Burgess, Fumero Pérez and Díaz Galán (2005) noted that one of the problems the writer had was that he had not articulated his contribution to the field clearly. As later discussed in Moreno (2010), this professor's problem was caused by his reluctance to criticize earlier work in the field and foreground his own contribution. The reluctance on the part of Spanish researchers to be critical of earlier work is also shown by various contrastive studies of English-Spanish academic discourse. For example, this is shown to happen consistently throughout all RA article sections in the field of business management (Mur, 2007) and in literary academic book reviews (Moreno & Suárez, 2008).

Given the differences found in the critical attitude of Spanish researchers towards previous academic works, and their own findings, it appears that a lack of critical attitude and/or a lack of positioning are more acceptable in the eyes of Spanish-medium journal gatekeepers than they are to those with editorial control of comparable English-medium journals. This is likely to reflect an L1 rhetorical practice into which Spanish researchers have been more or less implicitly socialised. We surmise that this rhetorical practice may have been unconsciously transferred to their writing of RAs in English (as

L2), causing them to face some unexpected WOE's in the publication process, which is likely to affect their perception of increased difficulty writing discussions in English (as L2). Thus in the present study we also hypothesise that the more familiar Spanish researchers are with the conventions of the RA genre in English-medium journals (including the display of an appropriate critical attitude towards their own and others' previous work) the less difficult they will find it to write discussions in English (as L2). In order to assess this effect better, we will compare it with the effects of familiarity with this genre in Spanish-medium journals and with the effects of proficiency level in English (as L2), both EGP and EAP.

3. What is the relative impact of the researchers' writing proficiency in English (as L2) versus their research publication experience on their perception of difficulty writing the Discussion section in English?

To explore this third question, we used the responses from the complete valid sample of informants ( $n = 1,454$ ) in order to include both those informants who had research publication experience as corresponding authors and those who did not. In order to assess the relevance of distinguishing between writing proficiency in EGP and EAP, Table 3 shows the means for informants' proficiency in the two languages according to the two domains of communication purposes under consideration and language skill. To compare means, we also applied the Student's *t*-test, adjusted using the Bonferroni correction.

Q10-Q11 N = 1454 Language skills	1 = very low 2 = low 3 = medium 4 = high 5 = very high				Contrast
	SGP Mean (SD)	EGP Mean (SD)	SAP Mean (SD)	EAP Mean (SD)	
Listening	4.98 (0.157)	3.31 (1.035)	4.96 (0.228)	3.73 (1.070)	(1) (2) (3)
Speaking	4.96 (0.224)	3.37 (1.046)	4.93 (0.300)	3.51 (1.115)	(1) (2) (3)
Interacting	4.94 (0.282)	3.21 (1.100)	4.92 (0.322)	3.38 (1.155)	(1) (2) (3)
Reading	4.98 (0.175)	4.18 (0.863)	4.97 (0.216)	4.45 (0.834)	(1) (2) (3)
Writing	4.93 (0.293)	3.54 (1.055)	4.92 (0.327)	3.64 (1.135)	(1) (2) (3)
Corresponding with editors, reviewers			4.93 (0.318)	3.83 (1.069)	(2)
Contrast: (1) SGP > EGP; (2) SAP > EAP; (3) EAP > EGP					

Table 3. Perceived level of proficiency in the use of SGP, EGP, SAP and EAP.

As can be seen, the means for each skill in English (as L2) are consistently lower than those for each comparable skill in Spanish (as L1) in both domains, as might be expected. In particular, Spanish researchers perceive their level of proficiency writing in EAP as 25.6% (1.28 points) lower than their level of proficiency writing in SAP, the difference being statistically significant (for  $p < 0.05$ ). In addition, our informants' level of proficiency in EGP for each skill is on average statistically significantly lower than their level of proficiency in EAP (for  $p < 0.05$ ), as is often mentioned. Of all the variables in Table 3, we selected writing proficiency in EGP and in EAP as the most relevant to our study.

The model we tested was one that had the dependent variable as Spanish researchers' perceived difficulty writing RA discussions in English (as L2), and the four independent variables as: 1) their perceived level of proficiency writing in EGP; 2) their perceived level of proficiency writing in EAP; 3) the number of RAs they had published as corresponding authors in Spanish (as L1); and 4) the number of articles they had published as corresponding authors in English (as L2). We conducted categorical regression analysis (CATREG) using data drawn from these four variables provided by the informants that answered our question about the dependent variable ( $n = 1,284$ ). Our results show that all independent variables included in the model are significant as explained by its standardized beta coefficient (proficiency in EGP  $\beta = -.155, p < 0.000$ ; proficiency in EAP  $\beta = -.350, p < 0.000$ ; number of articles in English  $\beta = -.087, p = 0.000$ ) except for the number of articles in Spanish ( $\beta = -0.061, p = 0.214$ ). The model is significant (ANOVA  $p < 0.000$ ) and 24.3% of the variance in the dependent variable is explained by the independent variables (adjusted R square = 0.243).

In order to graphically represent and compare the effects of all the variables included in this analysis, their values were typified so that the average was zero and the standard deviation was one. Then, ranges were automatically assigned by the statistical program, under the following statistical assumptions: given that we chose five range categories in order to fit the five-point Likert-type scale of the "writing proficiency" variables, the CATREG performed an optimal partition of the "publication experience" variables in order to find the five categories maximizing the correlation among variables. Thus those researchers who are within the same, but not necessarily regular, range in number of published RAs experience on average similar levels of difficulty, however large the range may seem. The points on the curves in Figure 2 below show where noticeable changes can be observed in the slopes.

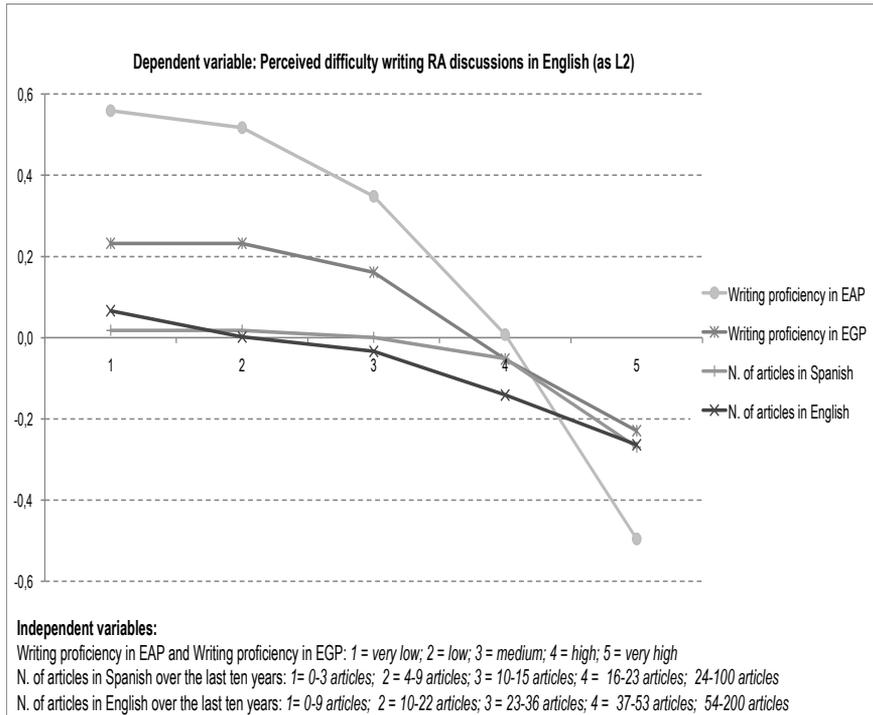


Figure 2. Effects of writing proficiency versus research publication experience on Spanish researchers' perceived difficulty writing RA discussions in English (as L2).

As shown in Figure 2, increases in value of the four independent variables are associated with decreases in the level of the dependent variable. However, relative to each other, Spanish researchers' perceived level of proficiency writing in EAP exerted the greatest negative influence ( $\beta = -.350$ ) on perceived difficulty writing RA discussions in English (as L2), followed by their perceived level of proficiency writing in EGP. However, neither of these effects becomes noticeable until informants report high or very high levels of proficiency in English (as L2) (values 4 and 5). Thus, the disadvantage that Spanish researchers perceive in the research publication world relative to native speakers of English (Ferguson, Pérez-Llantada & Plo, 2011) is justified. Importantly, the effect of self-reported level of proficiency writing in EAP is more noticeable and gradual than that of EGP.

Because our informants' average level of proficiency writing in EAP is 3.64, it might then be productive for them to attend specific EAP training sessions that allow them to improve their proficiency writing RAs in English and thus experience a notable decrease in their perceived difficulty.

As Figure 2 also shows, the number of articles published in English-medium journals does contribute significantly ( $\beta = -.087$ ), though to a lesser extent than proficiency writing in English (as L2). However, it is only when informants report having published at least 37 RAs as corresponding author in English-medium journals over the preceding ten years (values 4-5) that they experience on average a noticeable decrease in their perceived difficulty writing discussions in English. Since the number of RAs published in Spanish exerted an insignificant influence, it may be said that the type of publication experience that provides Spanish researchers with an additional understanding of disciplinary conventions, going beyond the benefits of a better command of written English (whether EAP or EGP) and general familiarity with disciplinary conventions, is publication experience in English-medium journals.

It is this additional understanding which might help them to lessen the potentially negative effects of transfer of certain L1 scientific writing rhetorical habits, such as their lower tendency to be critical. Because our informants have written on average 16.3 RAs for English-medium journals over the preceding ten years, their publication experience does not seem to be enough to achieve the benefits. This may also partly explain why they find it 8% more difficult to write RA discussions in English. Spanish researchers might therefore benefit from increased awareness of the existing differences in the rhetoric and style of successful RA Discussions across English- and Spanish-medium journals, as proposed in Moreno (2010).

## Conclusions

One major contribution of our survey study is that it has identified the discussion section as the most implicated in the increased difficulty perceived by Spanish researchers writing RAs in English (as L2) as opposed to Spanish (as L1) across all knowledge areas. Although these results are similar to those reported by Flowerdew (1999) on the basis of 26 interviews with Chinese researchers, they are more robust, given our more systematic data collection and rigorous analytical procedures and the considerably larger sample of

researchers under study. In our search for explanations, our innovative comparative approach has also made an important contribution to an ongoing debate in academic writing research by clarifying the relative impact of the level of writing proficiency in English (as L2) versus RA publication experience on Spanish researchers' increased difficulty writing RAs discussions in English (as L2).

Our findings suggest that the factor that most contributes to reducing Spanish researchers' perception of increased difficulty writing RA discussions in English is their increased level of proficiency writing in EAP. The effect of this factor is more noticeable and gradual than that of greater level of proficiency writing in EGP. These results, on the whole, clearly support Hanauer and Englander's (2011) conclusion that the level of proficiency in English (as L2) is a more influential factor than familiarity with the disciplinary conventions of scientific writing. However, as we have argued, our results are more robust, refined and specific. One clear pedagogical implication is that it would be more productive for Spanish researchers to attend EAP training sessions, with a special emphasis on writing RA discussions, than EGP courses.

We have also argued that Spanish researchers' lower level of proficiency in English (as L2) cannot be cited as the sole factor in the additional increase in their perception of the difficulty involved in writing RA discussions in English (as L2). Those who have more extensive publication experience in English-medium journals seem to have an additional understanding of disciplinary conventions in the RA genre in English-medium journals that goes beyond the benefits of a better command of written English (whether EAP or EGP) and, surprisingly, of increased familiarity with disciplinary conventions in the RA genre in Spanish-medium journals. Thus, based on Moreno's (2010) hypothesis about the likely transfer of Spanish researchers' tendency to be less critical toward their own and others' previous work in similar L1 research publication contexts, it is possible to suggest that increased publication experience in English may have helped Spanish researchers to offset the negative effects of transfer of this and other L1 rhetorical and stylistic features when writing RAs in English (as L2).

Further research will need to clarify whether transfer of such features does indeed occur, causing Spanish researchers with less publication experience in English to encounter unexpected WOEs in the process of RA publication in English-medium journals. If that were the case, EAP training sessions

specifically designed for Spanish researchers should raise their awareness of the identified differences as early in their research career as possible so that they do not need to wait until they have published such a large number of RAs in English to be able to reap the benefits. Lastly, our findings need to be treated with some caution as they are based on Spanish researchers' self-reported perceptions of difficulty rather than on direct observations of their WOE. Be that as it may, the way forward in designing future multiple case studies of the actual WOEs encountered by given profiles of Spanish researchers when writing RA discussions in English (as L2) is now much clearer.

## Acknowledgements

This study is part of a project financed by the Spanish Ministry of Science and Innovation (Ref.: FFI2009-08336/FILO), of which Ana I. Moreno is the PI. It would not have been possible without the collaboration of the following institutions and researchers: Consejo Superior de Investigaciones Científicas (CSIC); Universidad de León; Universidad de La Laguna, Pedro Martín-Martín; Universitat Jaume I, M<sup>a</sup> Lluisa Gea Valor; Universidad de Zaragoza, Rosa Lorés, Pilar Mur and Enrique Lafuente; the following technical staff (José Manuel Rojo, Belén Garzón and Almudena Mata) from the Statistical Analysis Service at the CSIC; Centro de Supercomputación de Galicia (CESGA); our interview informants and all the survey participants.

[Paper received 17 March 2012]

[Revised paper accepted 15 June 2012]

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## Appendix: Questions from online questionnaire (originally written in Spanish)

Q25. Indicate how much difficulty you experience in writing the following sections of research articles or the documentation involved in their publication in Spanish and in English. Use the following scale: 1 = none; 2= a little; 3 = some; 4 = quite a lot; 5 = a lot

	In Spanish							In English					
	1	2	3	4	5	N/A		1	2	3	4	5	N/A
1. The abstract													
2. The introduction													
3. The theoretical framework													
4. The materials and methods													
5. The results													
6. The discussion													
7. Other sections													
8. The conclusions													
9. The acknowledgements													
10. The letter accompanying the articles when it is sent to the journal													
11. The response to peer reviewers' comments.													
12. The correspondence with the editor during the evaluation process													
13. Other: (Please specify)													
(Please specify)													
(Please specify)													

Q9. What is your research field? Please indicate this using one or more of the UNESCO codes in the scroll-down menus. Choose the code or codes that best fits your research area.

Q10. What is your level of competence in the use of Spanish and English for general purposes? Please use the following scale: 1 = very low 2 = low 3 = medium 4 = high 5 = very high

		Spanish						English				
		1	2	3	4	5		1	2	3	4	5
1. Listening	e.g. Understanding TV and radio programmes											
2. Speaking	e.g. Describing events, giving instructions											
3. Interacting	e.g. Discussing topics of general interest											
4. Reading	e.g. Reading newspapers and popular science magazines											
5. Writing	e.g. Writing short stories, personal letters and letters of complaint.											

Q11. What is your level of competence in the use of Spanish and English for academic purposes? Please use the following scale: 1 = very low 2 = low 3 = medium 4 = high 5 = very high

		Spanish						English				
		1	2	3	4	5		1	2	3	4	5
1. Listening	e.g. Understanding lectures											
2. Speaking	e.g. Giving papers at conferences											
3. Interacting	e.g. Asking and responding to questions at a conference											
4. Reading	e.g. Reading articles about my research field											
5. Writing	e.g. Writing research articles and book chapters											
	e.g. Corresponding with editors and peer reviewers											

Q12. Please give the number of scientific articles you have published as corresponding author in each language over the last ten years.

	Number of articles
A. Spanish	
B. English	
C. Other languages	
(please specify) _____	
(please specify) _____	

