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Pre-modified Noun Phrases in a Comprehension-Based Approach to EFL at University Level

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Abstract

This study examines the difficulty shown by Spanish-speaking university students in decoding pre-modified noun phrases (NPs) in English. NPs carry a heavy lexical and conceptual load and foreign language (L2) readers may be challenged by first language (L1) crosslinguistic influence triggered by cognate NPs. Therefore, this study also attempts to determine whether the presence of cognates activates L1 syntactic patterns. A cross-sectional design was implemented using a sample of 160 undergraduates. Data was collected from intact groups at four levels of instruction. Results suggest that cognate words may hinder comprehension of longer pre-modified NPs because of L1 language transfer. They also indicate that these NPs are amenable to the instruction delivered through a comprehension-based approach. Learners with limited English proficiency benefit especially from such instruction.

Keywords*:* pre-modified noun phrases, crosslinguistic influence, Spanish-speaking undergraduate readers, limited English proficiency, cognates

Reading in a foreign language (L2) has long been seen as an interactive, complex and multidimensional process involving interactions between text information and the reader's knowledge and expectations (Alderson et al., 2015; Bernhardt, 1991). In her compensatory model of L2 reading, Bernhardt (2011) emphasizes that certain strengths in knowledge or skill can compensate for weaknesses in other areas. This compensatory processing was first proposed by Stanovich (1980) for reading in a first language (L1). Bernhardt's model also identifies the relative contribution of text-driven and knowledge-driven factors, and others, such as interest or motivation, to outcomes in reading. She concludes that L1 literacy and L2 language knowledge account for 50% of the variance in reading, while other individual reader variables, such as interest and prior knowledge, account for the remaining 50% in a rather idiosyncratic fashion. In an L2 reading setting, L2 language knowledge is a factor to underscore as it is highly variable and may thus potentially facilitate or hinder comprehension. Unlike learners on commercial English as a foreign language (EFL) courses, where learners are grouped by shared proficiency level, Argentine university students attend the same English course at university with varying levels of L2 proficiency. Most first-year undergraduates who attend the subject are likely to have an A1

or A2 level of English as defined by the Common European Framework of Reference for Languages (CEFR) but there are also some B1 and B2 level students. As A1 and A2 learners show a mismatch between their L1 proficiency and their immediate goal of understanding academic texts, they must resort to compensatory factors, such as domain-specific knowledge, reading strategies or access to cognates. Thus, learners' L2 proficiency becomes a key variable in understanding the L2 reading process and how learners acquire new L2 knowledge. This study explores the interaction of L2 proficiency with instruction in a comprehension-based approach and its effect on the way students decode and presumably acquire a key linguistic feature of academic texts: The noun phrase (NP).

This study was conducted at the School of Social Sciences of the University of Buenos Aires, where the following undergraduate degrees are taught: Communication Science, Political Science, Sociology, Social Work and Industrial Relations. By the end of the three levels that make up the 150–180 hour reading course, students are expected to understand social science texts in English. Although these texts often contain specific lexical, syntactic and discourse patterns that students may find unfamiliar, they also display a relatively high frequency of cognates. Cognates are words from L1 and L2 that overlap phonologically, orthographically, and semantically; for example, debatable-*debatible* are English-Spanish cognates. Our approach to reading instruction aims to develop students' compensatory strategic competence through the use of reading strategies that tap into preexisting knowledge of genre conventions (Castro de Castillo & Piuatti de Gómez, 2005), domain-specific knowledge (Sanchez Miguel, 1995), and knowledge of cognates (Lubliner & Grisham, 2017), among others. It also teaches key features of L2 such as affixation and discourse markers (Grabe, 2004). Since students have varying levels of higher-order reading skills in L1, they also receive direct instruction in main idea comprehension. Reading at university level entails applying reading skills to new discourse genres and reading purposes (Carlino, 2004). Class interaction is conducted mainly in students' L1, Spanish, as most students have poor speaking and listening comprehension skills in English.

L2 readers with limited proficiency face the challenge of making sense of L2 structure and lexis. Koda (2005) claims that we still have little knowledge about the impact that certain linguistic variables have on sentence processing. Likewise, Bernhardt (2011) insists on the need to isolate "features that cause comprehension breakdown" which are "the keys to enhanced, effective instruction and ultimately, to better and more sophisticated theory development" (p. 39). Among the students, we have observed that pre-modified NPs can be an important syntactic obstacle to constructing meaning. This observation coincides with research into L1 comprehension of NPs in Spanish and English scientific-academic texts (Hall & Marín, 2011; Halliday & Martin, 1993) and with research studies conducted in L2 reading in English (Benassi et al., 2011; Carrió Pastor, 2008). Halliday and Martin argue that the language of science to which L1 English-speakers are introduced throughout schooling is cognitively and linguistically demanding. Among other things, it requires students to unpack NPs to construct meaning.

An NP is a group of words that acts as a noun in a sentence. It includes an obligatory head and other structures that attach to it, such as pre-modifiers (before the head noun) and post-modifiers (after the head noun) (Biber et al., 1999). Complex NPs are composed of three or more elements including nouns and are lexically dense and conceptually loaded. Biber et al. (2009) claim that the increasing use of nominal modifiers has reflected the pressure to communicate information both efficiently and economically in expository prose, among

other registers, since the last century. NPs in English admit nouns as premodifiers, which allow them to convey information more economically. However, in English, premodification as opposed to postmodification entails a loss of explicit information because verbs and prepositions are missing (Carrió Pastor, 2008; Quirk et al., 1985). Readers must infer syntactic and semantic relations resorting mainly to background knowledge and context. Premodification (in scientific discourse) usually includes elements shared by both writer and reader. Biber et al. (1999, 2009) contend that "it is rare for all the multiple words in a premodification sequence to modify the head noun directly; rather, premodifier sequences usually have embedded relations, with some words modifying other premodifiers instead of the head noun. In a few cases, the meaning relations among constituents are truly ambiguous" (p. 597) as illustrated by the NP 'recent minority ethnic business graduates.' In pre-modified NPs in Spanish, determiners and adjectives may appear before the head noun, but post-modification bears most of the information load. For instance, the heavily pre-modified NP previously mentioned translates into a heavily post-modified NP in Spanish: *graduados de negocios recién recibidos que pertenecen a minorías étnicas*. As we can see, "complex premodification can accommodate a great deal of information, but with the risk that the comprehension might create problems of interpretation" (Biber et al. 1999, 2009, p. 595). At the same time, head recognition is key to comprehension, considering the head is the element "around which the other components cluster and which dictates concord" with the other parts of the sentence (Greenbaum & Quirk, 1990, p. 363). Spanish-speakers may fail to identify the head as they tend to decode complex NPs from left to right (crosslinguistic influence) instead of from right to left—the most frequent pattern for English (Carrió Pastor, 2008). Our study attempts to understand the decoding difficulties that pre-modified NPs present to our Spanish-speaking university readers. The key variables influencing these difficulties are assumed to be (a) students' L2 level of proficiency and (b) the number of hours of instruction received on our university course. Although decoding may be understood as the basic process of extracting phonological information (Koda, 2005), we will refer to decoding in a broader sense as 'comprehension' of microstructure (Kintsch, 1998).

The role of L1 in L2 acquisition and text processing is still unresolved. However, transfer, or crosslinguistic (Cook, 2016) or cross-language influence (Hipner-Boucher & Chen, 2016) as it is now called, is presumably triggered by the learner's perception that some L1 structures are transferable while others are not (Kellermann, 1983). L2 features perceived as infrequent, for example, are not deemed transferable. Crosslinguistic similarities, not differences, seem to tempt learners to map features of L1 onto L2. Thus, transfer appears to be activated when languages are related in some way.

Lexical crosslinguistic similarity tends to facilitate comprehension. In this sense, research in L2 reading has highlighted the positive role of L1. Bernhardt (2005) claims that "there is already some literacy knowledge on the part of all readers especially from cognate languages" (p. 139). Due to lexical borrowing from Latin and French, English shares a considerable number of cognates with Spanish. Various experimental studies have shown that this overlap allows for a cognate facilitation effect in which cognates are recognized more automatically (Bultena et al., 2013) and acquired more easily (Helms-Park & Dronijic, 2016) than non-cognates. Proficiency levels also influence the processing of cognates: learners with low L2 proficiency tend to process cognates faster than learners with high L2 proficiency.

On the other hand, cognates do not always lead to positive transfer of L1 knowledge. Since cognates generally activate L1 and L2 lexical representations simultaneously (Hipfner-Boucher & Chen, 2016) they can also cause misleading decoding patterns, typical of the L1, to be transferred. This is important because "the result of (repeated use of) transfer in comprehension is transfer in learning" (Ringbom, 2016, p. 42). In addition, Helms-Park & Dronjic (2016) consider the problem of treating partial cognates as if they were identical (p. 85). For example, a key concept in social science, 'union democracy,' is usually misunderstood as 'democratic union (of political parties)' since Spanish speakers identify 'union' as the head, without realizing that 'union' here means 'trade union' (*'sindicato'* or *'gremio'* in Spanish). Prior knowledge of Argentine history may also partly explain this deviant representation, for there was once a political party with this name. In short, certain cognates may specifically contribute to negative transfer of L1 in decoding pre-modified NPs. This study accordingly focuses on the role of cognates in the decoding and acquisition of pre-modified NPs.

The teaching of grammar in the field of second language acquisition has been a controversial issue for many decades due to unsuccessful outcomes and inconsistent research methods. Some debates have been resolved by a growing realization that the acquisition of certain L2 grammar features entails a long process involving an 'internal syllabus' (Corder, 1967; Ortega, 2009). For example, even when they receive explicit and extensive instruction on question formation, all L2 learners go through a series of developmental stages in which they produce transitional question forms (Ellis & Shintani, 2014). This process is potentially affected by their L1. These considerations have led some authors, for example, Krashen (1985), to reject the teaching of grammar as learners do not seem to learn what has been taught. More recently, there has been criticism of the role of production practice in the acquisition process. At the same time, there is an emerging consensus on the positive role of input-processing instruction. This aims to make sentences containing the target structure comprehensible by affecting the way input is perceived and processed (VanPatten, 2004). This comprehension-based approach has the advantage of promoting both the acquisition of the target structure and enhanced overall comprehension. There is also an efficiency benefit since it may work with mixed-ability EFL classes. Indeed, undergraduate reading comprehension courses have started to explore aspects of this approach because it is relevant for academic purposes and attainable for mixed-level EFL learners.

Over the last decades, reading comprehension instruction in Argentine universities has shifted from a focus on bottom-up processes, such as L2 grammar instruction and translation, to top-down processes. As mentioned earlier, these top-down processes include the use of domain-specific knowledge, discourse genre conventions, reading strategies, and metacognitive awareness (Goodman, 1994; Grabe, 2004; Souchon, 2006). As a result, we believe that we have undervalued L2 grammar and vocabulary instruction in our classes and that we should reassess the importance of developing learners' L2 knowledge via a comprehension-based approach. Currently, our curriculum relies on three pillars aiming at the development of the L2: (a) Incidental learning (students acquire features of L2 by actively attempting to comprehend academic text), (b) Intake facilitation (key language items are highlighted to promote awareness of a formal feature of L2, or students are provided with structured input activities aimed at establishing form-function connections), (c) Explicit knowledge instruction (students are provided with direct explanations and a self-study, bilingual handbook of academic grammar and lexis (Allamprese et al., 2017)

and handbooks for each level of instruction (Pampillo, 2014, 2016; Pampillo & Lauría, 2019).

To sum up, this study aims to determine the relative weight of a morphosyntactic feature of L2 knowledge (pre-modified NPs) in L2 comprehension in a real-life reading situation. The two languages involved (Spanish and English) share overlapping orthographic systems, and cognates are frequent in academic texts. Our study sets out to explore whether pre-modified NPs are amenable to instruction for Spanish-speaking participants with varying levels of L2 proficiency, in particular, instruction aimed at comprehension and not production of target language items. L2 proficiency and reading comprehension instruction tend to partially overlap in Bernhardt's (2000) revised model of the factors influencing EFL reading. However, given the widely different levels of proficiency shown by our learners, we decided to address these two factors independently. In addition, our analysis aims to determine how L1 syntactic knowledge may affect decoding through the presence of cognate pre-modified NPs.

Additionally, our findings may provide us with a better insight into the effectiveness of our teaching approach, especially for students with limited L2 proficiency. These students are at a disadvantage in the L2 classroom due to poor schooling experiences or negative attitudes toward the target language community (Gardner, 2012).

Specifically, the main questions addressed are the following:

1. Does instruction within a comprehension-based approach to L2 reading help Spanish-speaking undergraduates decode English pre-modified NPs accurately?
1.1 How accurately are the target language items decoded at the end of each level of instruction (English 1, English 2, English 3)?
1.2 What type or types of pre-modified NPs are decoded less accurately (short vs. long NPs, cognate vs. non-cognate NPs)?
1.3 What students—in terms of L2 proficiency—seem to profit the most from instruction?
2. Do cognate NPs facilitate L1 crosslinguistic influence? Specifically, do cognates impair accurate head identification in these NPs?
2.1 In an exploratory vein, what factors may favor negative L1 transfer in NP decoding?
3. To what extent does the level of proficiency explain success in decoding NPs?

Methods

Participants

The present study was based on a sample of 160 Spanish-speaking undergraduate students, aged 19–72 (mode: 23 years old, 42% male, 58% female), who were pursuing the five majors offered. The sample consisted of two intact groups of 20 students per level of instruction (Level 0: the beginning of English 1, Level 1: end of English 1, Level 2: end of English 2, and Level 3: end of English 3). Each English level is a 50 to 60-hour course.

The following information on participants' biodata was gathered: nationality, high school education, self-perceived English proficiency level, years of English instruction prior to

university, standardized English proficiency exams undergone, major at current school, number of courses accredited, previous university or high school degrees. Participants were asked to sign a research participation consent form and were told that their performance on the research test would be kept confidential and would not affect their grades.

Research design

A cross-sectional (pseudo-longitudinal) design was implemented in which the same data collection instrument was administered to intact groups during regular class time at the four levels of instruction from August to November 2016. The independent variable level of proficiency was operationalized through a written L2 placement test. The other independent variable level of instruction (Levels 0, 1, 2 or 3) was operationalized by selecting two intact groups of each level. The dependent variable acquisition of NPs was operationalized by students' level of decoding accuracy of NPs on a specially designed NP decoding test. For practical purposes from now on this variable will be named test score.

L2 placement test

To determine participants' level of L2 proficiency prior to the study, we administered the written placement test used at the Laboratorio de Idiomas (Language center belonging to the Facultad de Filosofía y Letras, UBA). This placement test has been validated with over 200,000 prospective students seeking to enroll in EFL university extension courses belonging to this institution. This test is taken under time pressure and is objectively scored on a 1–70 numeric scale. For the purposes of this study, the scale was further clustered into five levels of L2 proficiency corresponding to the five levels identified by CEFR as shown in Table 1:

Table 1

Levels of Proficiency According to Placement Score and CEFR

Placement score	L2 proficiency level	CEFR
1–15	Elementary	A1
16–30	Pre-intermediate	A2
31–45	Intermediate	B1
46–60	Upper-intermediate	B2
61–70	Advanced	C1

Noun phrase decoding test

To measure participants' comprehension of NPs, seven short authentic or minimally adapted academic text excerpts were selected to promote a context-based paraphrase in L1. Texts were related to the participants' majors, and each had an average extension of 130 words. Text extracts were chosen according to the following criteria: students' assumed domain-specific knowledge, explicit textual organization, and presence of cognate elements.

Each extract contained two NPs of the same compositional pattern in terms of number and type of pre-modifying constituents. Of each pair of the same compositional pattern, one

NP was made up of cognate constituents and the other of non-cognate constituents as can be seen in Table 2:

Table 2

Noun Phrase Selection

Nº of components	Description	Cognate NP	Non-cognate NP
2	N + N	audience interaction	citizen journalism
2	ADJ (+ *-ed*) + N	unauthorized immigrants	skilled employees
2	Genitive + N	individual's desire	world's poor
3	N + N + N	labor market experience	gender pay gap
4	ADJ + ADJ + N + N	French political battle scene	long hardline war speech
5	ADV + ADJ + N + N + N	highly technical power generation personnel	fully updated storm damage survey

Note. N= noun, ADJ = adjective, ADV = adverb. Number of constituents does not include determiners.

At the beginning of the test, an example was provided to facilitate participants' interpretation of instructions (text 0). Participants were asked to translate the underlined NPs (Translation task) into Spanish and then to reformulate them in a single sentence on the basis of their meaning in context (NP comprehension task). Prior research has shown that readers' use of L1 when completing comprehension assessment tasks reveals a closer depiction of comprehension; therefore, all assessment tasks in this study were completed in the participants' L1 (Wolf, as cited in Brantmeier, 2006). Participants were given three hours to complete the test and the researcher or research assistant was present at all data collection times to ensure that they did not use any translation software, except for WordReference.com.

The same seven texts were presented in two different protocols (A and B) in a different order to prevent a fatigue effect. In addition, distractor items that focused on other target language items were included to prevent participants from being aware of the focus of the study. This design aims to mainly tap into learners' implicit knowledge as they have to construct a representation of the L2 in which the focus is on meaning and there is a time limit to complete the task (Ellis, 2009) (see Appendix A for a sample task of the noun phrase decoding test).

Three pilot tests were conducted before reaching the final version of the instrument. The most significant amendments were related to the selection of NPs and instructions.

Data-coding and scoring

To ensure the validity of the scoring criteria, the final protocols were piloted among bilingual experts in order to agree on answers that would be accepted for the answer key. We only scored NPs whose head noun had been correctly identified (i.e., no credit was awarded to translated NPs whose head was chosen among pre-modification elements from the L2 NP). For example, *'audiencia interactiva'* [interactive audience] for 'audience interaction' would not be given any credit. These criteria were maintained even in those

cases in which the distorted translation was accompanied by a reasonable expanded definition of the NP in the comprehension task. Let us bear in mind that the focus of this study lies in the acquisition of NPs so that repeated incorrect head identification, as stated earlier, may reveal the lack of relevant L2 knowledge or L1 transfer. NPs were scored according to the following criteria shown in Table 3:

Table 3

Scoring Scale

Criteria	*Score*
Does not identify the head	0
Identifies the head but answers on translation task *and* comprehension task are incorrect	5
Identifies the head but answers on translation task *or* comprehension task are incorrect	7.5
Identifies the head and answers on translation task *and* comprehension task are correct	10

Protocols were blind-scored by both researchers following the key. Disagreements were discussed to reach a consensus. The following acceptability criteria were used in the two tasks:

Translation task

This task asked participants to translate the given NP. Performance was scored according to head identification and translation acceptability. Regarding head identification, a score was awarded if a semantic approximation of the head was provided, for example, if the noun phrase 'skilled employees' was translated as '*empleo calificado'* (skilled employment) instead of the expected answer, '*empleados calificados'*, head identification was considered correct. Knowledge of L2 syntactic patterns could be inferred from this answer. As regards translation acceptability, distorted translation of vocabulary items—such as '*empleo'* for 'employee'—was not awarded any credit since this type of answer did not show the appropriate paraphrase of the NP. However, as mentioned earlier, credit was awarded for correct head identification.

Comprehension task

To assess NP comprehension, participants were asked to express in one sentence what the NP meant in the context of the text. The literal translation of the NP does not necessarily provide evidence of comprehension of the concept or event depicted by the NP. An example of an expected answer for 'unauthorized immigrants' would be '*inmigrantes ilegales que no tienen permitido ingresar en EE.UU'* (Mexicans who enter the USA illegally). Finally, the score for each NP was tallied following the criteria exhibited in Table 3 to create a summary score which would allow us to identify those NPs that turned out to be more difficult to decode.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS) was used to determine correlation measures (Pearson product-moment correlation coefficient) between the dependent variable (Test score) and the two independent variables (Level of proficiency and Level of instruction). R^2 and ETA^2 were calculated for effect size. An analysis of variance was performed on variable level of instruction and on each NP to see whether differences were significant; a Tukey test was then used to identify where the significant differences lay and avoid type I error. To test the null hypothesis that X cognate NPs = X non-cognate NPs, a paired sample *t* test was performed.

Results

Effects of instruction

The first two questions of this study examined the relationship between the level of instruction, the level of proficiency and the participants' test score on a test of simple and complex pre-modified NPs in the context of reading academic texts in English as an L2. To have an overview of participants' performance on the NP decoding test, we can see in Table 4 below that of the total of 160 participants, the mean score for the sample was 78 points out of a possible maximum score of 120 points; in other words, there was an overall rate of success of 65% and the minimum score obtained was 7.50 points.

Table 4

Descriptive Statistics

	Test score
N	160
M	78.96
SD	27.18
Range	7.50–120

Participants' score on the NP decoding test concerning the level of proficiency (Table 5) shows that as the proficiency level of the participants increases so does their mean test score. It is worth noting that elementary level (A1) participants as a group (72.22) perform below the overall mean test score for the sample (78.96) (Table 4).

Table 5

Level of Proficiency and Performance on the Test

Level of proficiency	Mean test score
A1	72.22
A2	83.42
B1	87.06
B2 and C1	99.29

Similarly, values on Table 6 suggest that as students progress through the levels of instruction, there is an increase in students' test score.

Table 6

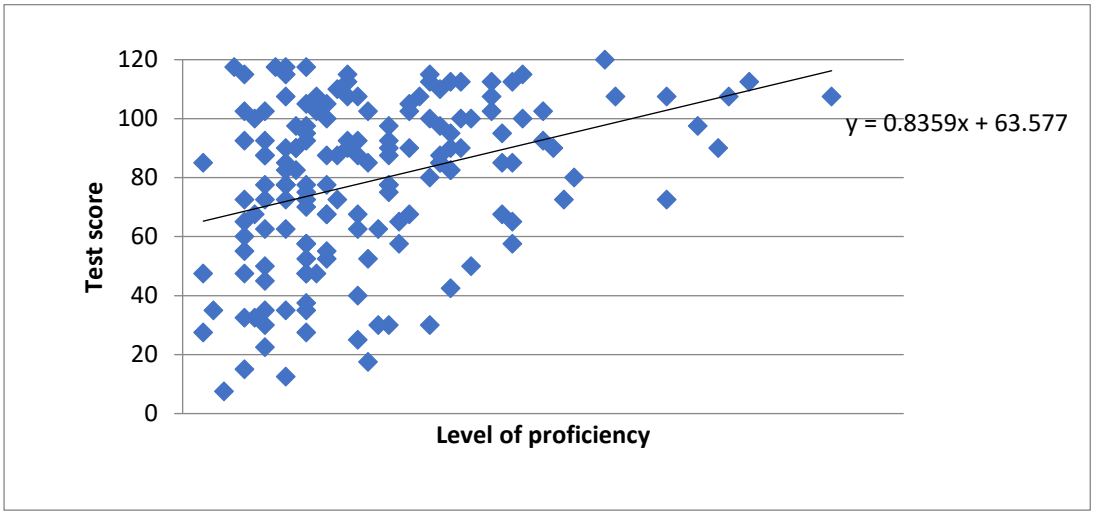
Level of Instruction and Performance on the Test

Level of instruction	Mean test score
0	65.50
1	71.56
2	84.13
3	94.69

Concerning the degree of association between the level of proficiency and test score, a regression line was calculated as can be seen in the scatterplot below. Although the points do not lie in a perfect line, there is a general upward trend in the data, meaning that the higher the level of proficiency, the higher the test score as shown in Figure 1.

Figure 1

Regression between Level of Proficiency and Test Score



With regards to the relationship between independent and dependent variables, correlation measures between level of proficiency and level of instruction, on the one hand, and test score (see Appendix B), on the other, reveal that there is a moderate positive relationship between independent and dependent variables (level of instruction, $r = .413$, $p < 0.0001$; level of proficiency $r = .354$, $p < 0.0001$). Thus, scores on the test increase with increasing proficiency level and scores on the test increase as learners move on to the following course level. However, as the analysis of the relationship between level of instruction and test score reveals a non-linear relationship, eta-squared ($\eta 2$) was calculated for effect size, which is appropriate for data in which the dependent variable is measured on one scale and the independent variable is measured on a nominal and ordinal scale. Results on this test ($\eta 2 = .174$) indicate a large effect size (Cohen, cited in Larson-Hall, 2010).

As shown earlier (Table 6), participants' performance on the test increases as their level of instruction increases; however, to assess if these differences are significant, a one-way analysis of variance was calculated to determine the effects of instruction on decoding of NPs. Results in Table 7 below show that differences are significant ($p < 0.0001$); therefore, we may assume that the distribution among groups is not homogenous, thus rejecting the null hypothesis that the means among levels are equal.

Table 7

One-way ANOVA

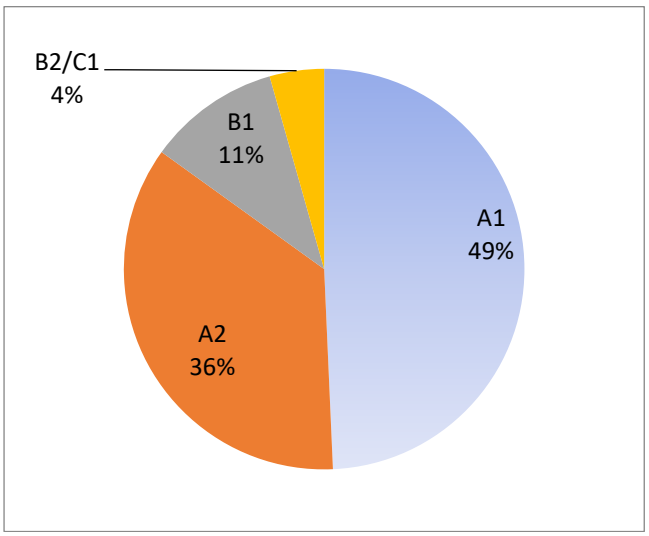
	SS	*df*	*MS*	*F*	*P*
Inter-groups	20397.031	3	6799.010	10.918	.000
Intra-groups	97145.313	156	622.726		
Total	117542.344	159			

Finally, Tukey's test (see Appendix C) was conducted to specifically identify where the differences lie. Differences between mean test scores are significant after at least two levels of instruction with a 95% confidence level; precisely between Level 0 and Level 3, Level 0 and Level 2, or Level 1 and Level 3, even if mean test scores for each level of instruction reveals a considerably higher mean as levels increase (Table 6).

Additionally, for level of proficiency, Figure 2, presents the frequency distribution of proficiency levels of the sample according to CEFR (see Table 1). It should be noted that most participants display a very low level of proficiency: half the sample performs at an A1 level and 36% at an A2 level; very few students are advanced (4%).

Figure 2

Actual Level of Proficiency



Noun phrases

One of the main focuses of this study was the level of decoding accuracy of the various NPs assessed. Overall, we wanted to determine which NPs were the most difficult ones in terms of the number of elements (2, 3, 4 or 5) and, in particular, their level of difficulty at the end of each level of instruction.

Figure 3 depicts the mean test scores for each NP for the whole sample. NP 'Unauthorized immigrants' obtained the highest score (8.6) whereas NP 'highly technical power generation personnel', the lowest one (4.5). In general terms, accuracy decreases as NP length increases, yet certain NPs appear to alter this pattern. For instance, 'world's poor' obtained 5.2 points, significantly below the decreasing trend, and 'labor market experience' obtained 7.6, which is slightly above the expected decreasing trend.

Figure 3

Noun Phrases and Mean Test Score

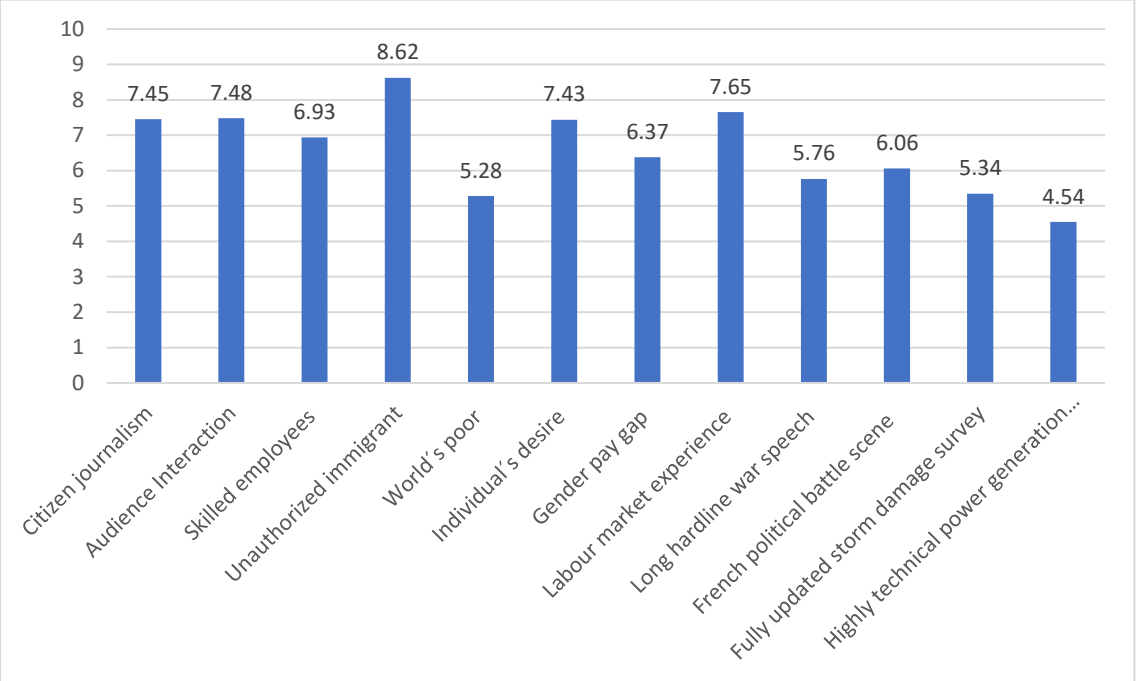


Table 8 presents the mean score for each NP according to proficiency levels. On the whole, the mean test score for all NPs increases gradually from A1 level participants to B2 and C1 level participants being the only exception 'world's poor'. In this case, A1 and B1 participants' mean test scores were similar, 4.7 and 5.2 respectively, whereas B2 and C1 participants had the lowest score, 3.5, though with a reduced sample of only seven participants.

Table 8

Mean Test Score for Noun Phrases and Level of Proficiency

	Levels of proficiency			
	A1	A2	B1	B2/C1
Citizen journalism	6.84	7.94	7.65	10.00
Audience interaction	6.80	8.03	7.79	10.00
Skilled employees	6.71	7.91	8.18	9.21
Unauthorized immigrants	8.04	9.08	9.56	9.29
World's poor	4.75	6.23	5.29	3.57
Individual's desire	7.03	7.46	8.53	9.29
Gender pay gap	5.66	6.75	7.50	8.57
Labor market experience	7.53	7.63	7.94	8.57
Long hardline war speech	5.06	6.05	6.76	8.93
French political battle scene	5.25	6.75	6.76	7.86
Fully updated storm damage survey	4.87	5.57	6.18	6.79
Highly technical power generation personnel	4.02	4.52	5.74	7.86

The instruction effect for each NP can be glimpsed from Table 9. We can observe the same increasing trend for mean test score as for the effect of level of proficiency.

Table 9

Mean Test Score for NP and Level of Instruction

	Level of instruction				
	0	1	2	3	*Grand Mean*
Citizen journalism	6.31	7.31	7.87	8.31	7.45
Audience interaction	6.06	7.50	7.63	8.75	7.48
Skilled employees	5.62	6.75	7.06	8.31	6.94
Unauthorized immigrants	8.50	8.25	9.00	8.75	8.62
World's poor	3.75	4.50	5.62	7.25	5.28
Individual's desire	6.69	7.50	8.00	7.56	7.44
Gender pay gap	5.25	5.19	7.19	7.87	6.37
Labor market experience	7.13	7.06	8.13	8.31	7.66
Long hardline war speech	4.44	4.94	6.19	7.50	5.77
French political battle scene	4.25	5.75	7.19	7.06	6.06
Fully updated storm damage survey	3.12	4.31	6.06	7.88	5.34
Highly technical power generation personnel	4.37	2.50	4.19	7.12	4.55
Grand Mean	5.45	5.96	7.01	7.88	6.58

Overall, the mean test score for each NP increases gradually from the beginning of English 1 (Level 0) to the end of English 3 (Level 3). To test if differences according to Level of

instruction are significant an analysis of variance was performed. Results (see Appendix D) show that differences in the performance for all NPs but three are statistically significant: 'unauthorized immigrants' (p = .612), 'an individual's desire' (p = .335) and 'labor market experience' (p = .074).

Finally, we would like to focus on the performance of A1 participants since this group is the target audience of our curriculum. These participants perform similarly to the rest of the sample in terms of the increasing level of difficulty posed by longer NPs; however, if we observe their overall mean test score in Table 10, we gather that although in Level 0 their score is significantly lower (53.2 points) than that of the other levels of proficiency, their score increased dramatically to 96.87 in Level 3, revealing a higher gain in L2 knowledge than the rest.

Table 10

Overall Performance by Level of Instruction and Level of Proficiency

	Levels				
	0	1	2	3	*M*
A1	53.25	65.57	74.12	96.87	72.22
A2	73.86	76.83	89.00	90.94	83.42
B1	71.50	88.75	91.67	98.75	87.06
B2 and C1	96.25	90.00	110.00		99.29
M	65.50	71.56	84.13	94.69	78.97

In sum, shorter NPs were easier to decode than longer ones. As participants' proficiency level increases so does their score on each NP. As regards the effects of our comprehension-based approach, the effects of instruction are statistically significant for the acquisition of pre-modified NPs when participants have attended a minimum of two or three levels except for three cognate NPs (see Appendix D). A1 students display the highest progress throughout the course for this linguistic item.

Cognate versus non-cognate noun phrases

This study also intended to compare cognate and non-cognate NPs of the same number and type of elements to determine whether the presence of cognates facilitated decoding or enabled the transfer of L1 syntactic patterns. Our assumption was that the transfer of L1 would result in impoverished performance on the test for the cognate NP of each pair. A paired sample t test was performed to test whether the differences within each pair were significant (see Appendix E). Differences between mean test scores for each pair were significant except for the test scores of the pair 'citizen journalism'-'audience interaction', and for the pair 'French political battle scene'-'long hardline war speech'. In the analysis of the significant differences, for two-to-four-element NPs we observe that the mean score for the cognate NP is slightly higher or the same as the score for the non-cognate counterpart. For example, 'unauthorized immigrants' (8.6 points) was easier to decode than 'skilled employees' (6.9 points) (see Figure 3). However, this trend is reversed in the case of the 5-element NP 'highly technical power generation personnel' (4.5 points), which turned out to be more difficult than its non-cognate counterpart 'fully updated storm damage survey' (5.3 points) at a significance level of p = .008.

Discussion

This study was designed to answer certain empirical questions about the difficulties Spanish-speaking readers have in decoding pre-modified NPs in English social science texts. The broader aim was to assess the effectiveness of our comprehension-based approach, specifically for A1 and A2 level students, who are the target group of our curriculum. Factors such as L2 proficiency, the effect of instruction, L1 transfer, and the presence of cognates were considered in the research questions. These reflected Bernhardt's (2000) research agenda, which encourages researchers to identify the relative weight of L2 reading factors in specific reading situations. We will begin our discussion by reviewing the empirical findings.

As stated in the Results section, the effect of instruction proved to be significant (Table 7, $p < 0.0001$). However, this was true mainly of students who had attended at least two levels of instruction (Table B1). These findings suggest that reading comprehension approaches that include instruction on features of L2 (see Introduction) may contribute to the acquisition of NPs. They also agree with findings by Carrió Pastor (2008) and Habra & López (2012) that instruction improves comprehension of NPs, as well as overall performance in reading scientific text. In addition, the time needed to acquire these units supports previous findings, which show that acquisition of various L2 features takes considerable time both in naturalistic and instructed settings (Ortega, 2009). The current findings suggest that the acquisition time of certain L2 features should not be overlooked, either in teaching or in assessment. In our own context, English 1 exams should be carefully designed to ensure that enough scaffolding is provided for these students, whose L2 knowledge and skills are still developing after only one level of instruction.

In this respect, our findings show that A1 students (Table 10), who made up almost 50% of our sample, progressed remarkably in the acquisition of these units (from 53.25 points to 96.87). In other words, they seem to have profited from instruction. The success of these elementary-level EFL students is particularly significant as it shows that our learning objectives are within their reach. Our impression is that A1 learners did not receive quality English instruction during their schooling years. It should be remembered that L2 instruction at public universities in Argentina targets students with little or no L2 proficiency. The idea is that all students that attend the three levels of English should be able to accomplish reading goals successfully regardless of their initial level. These findings highlight the challenge that mixed-ability L2 classes pose to teachers, who may leave out low ability students to keep the flow of activities in progress (Bernhardt, 1991).

Another of our concerns was to determine how the various lengths of NPs affected their decoding and ultimate acquisition. Accurate decoding of all NPs except for three shows a statistically significant steady increase across course levels (see Appendix D). These results suggest that the decoding of the three NPs containing two to three cognates ('individual's desire', 'unauthorized immigrants' and 'labor market experience') was not related to instruction. It can be explained mainly by access to cognates, but also by compensatory factors such as domain-specific knowledge and use of context (Spath Hirschmann, 2000; Wolter & Helms-Park, 2016). By contrast, performance on all longer NPs (four to five elements) showed statistically significant increases over levels of instruction and, in fact, gains were considerable. Compensatory factors seem to become less important in decoding these units in Level 0 and instruction and acquisition of L2 knowledge seem to play a consistent role throughout the three-course levels. In sum, the

number of elements in the pre-modification seems to account for the decoding difficulty of our participants. Since long NPs appear to hinder correct head identification, most readers may not be able to activate appropriate domain-specific schemata, which might otherwise compensate for a lack of L2 knowledge. Therefore, decoding of these NPs must rely on L2 knowledge gained from instruction.

The outlier 'world's poor' challenges the ease of interpretation of shorter NPs in our results, which may shed light on some of the factors that favor L1 transfer in NP decoding. This NP obtained a much lower score (5.3) than that obtained by simple NPs (8 points on average) (see Table 9). Instead of the expected answer '*los pobres del mundo*', many participants produced variants of '*el mundo pobre*' (the poor world), where the first element became the head noun of the translation. What could account for this outlying value? To begin with, the head of the NP, 'poor', is a nominal adjective identifying a social group ('the poor'), while most learners have probably met it only as a modifier ('poor people'). In addition, the pre-modifier 'world' is a noun. This linguistic pattern probably facilitated the transfer of the most common pattern of Spanish for NPs (a head noun followed by an adjective). What is more, the anomalous translation '*el mundo pobre*' fits the overall meaning of the paragraph, preventing the reader from metacognitively adjusting his or her initial hypothesis. In fact, the difference between '*el mundo pobre*' (the poor world) or '*los pobres del mundo*' (the world's poor) is very slight in this context. Another factor that may explain participants' failure to identify the genitive as a premodifier is its low frequency in an academic text (see Carrió Pastor, 2008). In addition, B2 and C1 participants obtained the lowest mean score (3.5). As learners reach higher levels of proficiency, they may be more willing to take greater 'syntactic risks.'

Our last research question dealt with the relationship between cognate NPs and their role in the decoding of NPs. As mentioned earlier, readers with limited L2 proficiency are widely held to rely on cognates for understanding L2 academic text. Yet previous studies and our own classroom observation suggest that cognates also hinder comprehension. This may be because cognates overlap only partially (Helms-Park & Dronjic, 2016) or because they trigger negative L1 transfer by which "L1 specific patterns are activated involuntarily through the L2 input" (Koda, 2005, p. 111). The case of 'union democracy' presented earlier illustrates both processes. Our results, however, only partly supported our assumption that cognates result in negative L1 transfer in the case of pre-modified NPs. Although cognate two-to-four-element NPs were slightly easier to decode—on average they obtained a one-point higher score than their non-cognate counterparts—not all these differences were statistically significant; mean scores for 'citizen journalism'-'audience interaction' (p = .919), and 'French political battle scene'-'long hardline war speech' (p = .391) (see Appendix E) were not statistically significant. In other words, the evidence suggests that in two-to-four-element NPs, cognates tend to either facilitate correct decoding or play no role in the process. However, in the case of five-element NPs, results do support our assumption that cognates may promote the negative transfer of L1 patterns: Differences between 'highly technical power generation personnel' (4.5 points) and non-cognate 'fully updated storm damage survey' (5.3 points) were statistically significant (p = 0.08) as shown in Table E1 (Appendix E). Why did cognates facilitate transfer in this longer NP? For a possible explanation, we should analyze some samples from our participants in which the head noun was incorrectly identified in the cognate NP:

Las técnicas del personal de generación de poder [The techniques of (the) generation of power personnel]

Estas altas técnicas de generación de energía [These high techniques of power generation]
Estas generaciones personales de conocimiento técnico y poder [These personal generations of technical knowledge and power]
Esta generación de personal altamente técnico [This generation of highly technical personnel]

The lower score on this NP stems mainly from lack of head identification. As can be seen, the choice of 'technical' and 'generation' as heads led to distorted interpretations and translations. The variation of translation patterns also reveals "the complexity of recognizing [complex pre-modified NPs'] inner semantic interrelations" as claimed by Carrió Pastor (2008, p. 38). However, one may wonder why participants did not choose 'personnel' as head, given the fact that it is also a similar cognate. As stated earlier, under certain conditions, learners may rely on their L1. Processing of long NPs—which were new to most students—may have caused a cognitive overload. Sweller (2010) claims that when "cognitive load exceeds working memory capacity, information processing, including learning, will be compromised" (p. 40). As mentioned earlier, cognates facilitate L2 processing for low-level learners. The presence of similar cognates ('technical' and 'generation') in the premodification and cognitive overload may have led participants to fall back on their L1 and ignore their explicit knowledge of L2 NPs. All in all, under certain conditions, cognates may 'invite' readers to establish interlingual identifications between L1 and L2.

The findings of this study need to be seen in the light of some limitations. Firstly, these results express an accuracy order of NPs, from which order of acquisition may be inferred. As stated earlier, repeated transfer in comprehension may lead to transfer in acquisition. However, a truly longitudinal design would be required to confirm these initial findings (Cook, 1993). Unfortunately, such a design would be highly problematic because of the likelihood of subject attrition. Secondly, the number and type of NPs used in this study are limited and the long NPs are uncommon, which may constrain the generalizability of the results. Future research should expand the sample of NPs used and ensure that they are more representative of the actual academic register. A future investigation might also expand upon the present findings by assessing learners' identification of NP boundaries in sentence parsing.

Conclusion

Knowledge of NPs is key to L2 academic reading comprehension in English. In particular, pre-modified NPs are said to challenge Spanish-speaking readers because of their structural complexity, heavy concept load and the possibility of cross-linguistic influence. However, the present study with undergraduate readers indicates that although pre-modified NPs may challenge L2 decoding, they are amenable to instruction within a comprehension-based approach. After three levels of instruction, readers attain a high level of decoding accuracy.

Interestingly, results show that A1-level learners—who comprise almost 50% of our sample—benefit the most from instruction. This finding is particularly important since L2 proficiency is a key component of the construct of L2 reading, and low-level learners are the target of our curriculum. As a free, public university, we must make sure that students

who have not had quality English instruction in the K-12 public school system can nevertheless achieve their learning objectives.

Finally, there is the question of whether cognates play a facilitative or debilitative role in academic reading comprehension. Our findings support the belief that, generally speaking, cognates facilitate decoding, yet when embedded in L2 patterns that challenge learners' working memory, they may promote negative L1 transfer.

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Appendices

Appendix A

Sample task taken from Noun phrase decoding test

Texto 3: European Union. (2013). *Tackling the Gender Pay Gap in the European Commission*. Luxembourg: Publications Office of the European Union. (p. 5)
(…) The gender pay gap is shown as a percentage of men's earnings and represents the difference between the average gross hourly earnings of male and female employees. Gross earnings are wages or salaries paid directly to an employee before any deductions for income tax and social security contributions are made. In the EU, data on the gender pay gap is based on the methodology of the Structure of Earnings Survey (SES).

In the EU, the gender pay gap is referred to officially as the 'unadjusted gender pay gap', as it does not take into account all of the factors that impact on the gender pay gap, such as differences in education, labour market experience, hours worked, type of job, etc. Even

when these factors are taken into consideration, more than half of the gender pay gap remains unexplained. (…)

Traduzca al español las frases subrayadas

3.1 THE GENDER PAY GAP: ……

3.2 LABOUR MARKET EXPERIENCE: ……

Explique las frases que reformuló en una sola oración según lo que significan en el texto.

3.3 THE GENDER PAY GAP: ----------

3.4 LABOUR MARKET EXPERIENCE: ----------

¿Qué marca el prefijo un- en unexplained subrayado en el texto?

3.5 ----------

Note. 3.5 is a distractor item.

Appendix B

Table B1

Correlation Measures

		Test score	Level of instruction	Level of proficiency
Test score	Pearson correlation	1	.413**	.354**
	Sig. (2-tailed)		.000	.000
Level of instruction	Pearson correlation	.413**	1	-.001
	Sig. (2-tailed)	.000		.985
Level of proficiency	Pearson correlation	.354**	-.001	1
	Sig. (2-tailed)	.000	.985	

Note. ** $p < .01$, $N = 160$.

Appendix C

Table C1

Tukey's Test

				M Difference (I-J)	Sig.	95% CI	
						LL	UL
(I) Level of instruction	Level 0	(J) Level of instruction	Level 1	-6.06	.698	-20.55	8.42
			Level 2	-18.62*	.006	-33.11	-4.13
			Level 3	-29.18*	.000	-43.67	-14.69
	Level 1	(J) Level of instruction	Level 0	6.06	.698	-8.42	20.55
			Level 2	-12.56	.114	-27.05	1.92
			Level 3	-23.12*	.000	-37.61	-8.63
	Level 2	(J) Level of instruction	Level 0	18.62*	.006	4.13	33.11
			Level 1	12.56	.114	-1.92	27.05
			Level 3	-10.56	.235	-25.05	3.92
	Level 3	(J) Level of instruction	Level 0	29.18*	.000	14.69	43.67
			Level 1	23.12*	.000	8.63	37.61
			Level 2	10.56	.235	-3.92	25.06

Note. CI = confidence interval; LL= lower limit; UL= upper limit. *p <.05, *SE*=5.57.

Appendix D

Table D1

Noun Phrases - One-way ANOVA for Level of Instruction

		SS	*Df*	*MS*	*F*	*P*
Citizen journalism	Between groups	89.92	3	29.831	2.751	.045
	Within groups	1691.406	156	10.842		
	Total	1780.898	159			
Audience interaction	Between groups	145.742	3	48.581	3.891	.010
	Within groups	1947.969	156	12.487		
	Total	2093.711	159			
Skilled employees	Between groups	146.563	3	48.854	4.198	.007
	Within groups	1815.313	156	11.637		
	Total	1961.875	159			
Unauthorized immigrants	Between groups	12.500	3	4.167	.606	.612
	Within groups	1072.500	156	6.875		
	Total	1085.000	159			
World's poor	Between groups	277.969	3	92.656	4.630	.004
	Within groups	3121.875	156	20.012		
	Total	3399.844	159			
Individual's desire	Between groups	35.938	3	11.979	1.141	.335
	Within groups	1638.438	156	10.503		
	Total	1674.375	159			
Gender pay gap	Between groups	223.438	3	74.479	4.325	.006
	Within groups	2686.563	156	17.222		
	Total	2910.000	159			
Labor market experience	Between groups	51.406	3	17.135	2.361	.074
	Within groups	1132.188	156	7.258		
	Total	1183.594	159			
Long hardline war speech	Between groups	225.430	3	75.143	6.052	.001
	Within groups	1937.031	156	12.417		
	Total	2162.461	159			
French political battle scene	Between groups	225.938	3	75.313	4.424	.005
	Within groups	2655.938	156	17.025		
	Total	2881.875	159			
Fully updated storm damage survey	Between groups	516.406	3	172.135	12.405	.000
	Within groups	2164.687	156	13.876		
	Total	2681.094	159			

Highly technical power generation personnel	Between groups	439.805	3	146.602	10.355	.000
	Within groups	2208.594	156	14.158		
	Total	2648.398	159			

Note. *$p < .05$. A Tukey test was conducted to determine where differences were significant. Results show that, in general terms, for nine NPs, test scores exhibit significant differences according to level of instruction when three levels of instruction (from level 0 to level 3) have been attended. In six of these NPs, differences were significant after two levels of instruction (from level 1 to level 3). For only one NP: 'highly technical power generation personnel' ($p = .003$), differences were significant after one level of instruction (from level 2 to level 3).

Appendix E

Table E1

Paired Sample t test of Cognate and Non-cognate Noun Phrases

					95% CI				
		M	*SD*	*SEM*	*LL*	*UL*	*t*	*df*	Sig. (2-tailed)
Pair 1	Citizen journalism Audience interaction	-.03125	3.86473	.30553	-.63468	.57218	-.102	159	.919
Pair 2	Skilled employees Unauthorized immigrants	1.68750	3.37105	.26651	1.16115	2.21385	6.332	159	.000
Pair 3	World's poor Individual's desire	2.15625	4.62839	.36591	1.43359	2.87891	5.893	159	.000
Pair 4	Gender pay gap Labor market experience	-1.28125	3.98491	.31503	-1.90344	-.65906	-4.067	159	.000
Pair 5	Long hardline war speech French political battle scene	.29688	4.36513	.34509	-.38468	.97843	.860	159	.391
Pair 6	Fully updated storm damage survey Highly technical power generation personnel	-.79688	3.73421	.29522	-1.37992	-.21383	-2.699	159	.008

Note. CI = confidence interval; LL = lower limit; UP = upper limit. Pair 2, 3, 4 and 6 reject the null hypothesis of equal means at a 95% level of confidence.

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