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Learning word class in a second language through vocabulary learning activities: definition-choosing, gap-filling, and sentence-writing.

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ABSTRACT

This article presents the results of a research project investigating how a student's ability to successfully learn vocabulary of four word classes (nouns, adjectives, verbs and adverbs) is affected by the activity through which it is practised. Two-hundred and ninety-two B1 SL students of Spanish were presented with one of three different activities requiring different involvement loads: (1) choosing the appropriate definition; (2) filling in gaps in sentences; and (3) writing sentences that include target words. The analysis shows that participants recalled and recognised more nouns and fewer adverbs—the only non-inflected word class. Additionally, sentence-writing is the activity through which learning new words is the easiest; and the least effective is the definition-choosing activity.

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Word class; vocabulary; learning activity; Spanish; Spanish as Second Language

RESUMEN

Este artículo presenta los resultados de una investigación sobre cómo la habilidad del estudiante para aprender palabras de cuatro categorías gramaticales (nombres, adjetivos, verbos y adverbios) se ve influida por la actividad con la que trabaja. 292 estudiantes de nivel B1 de español como L2 practicaron con una de tres actividades con diferente nivel de participación: (1) elegir la definición correcta; (2) completar oraciones; y (3) escribir oraciones que incluyan las palabras estímulo. El análisis muestra que los participantes aprendieron más nombres y menos adverbios (siendo esta la única categoría gramatical invariable). Por otro lado, la escritura de oraciones es la actividad que más facilita el aprendizaje de palabras de cualquier categoría y la menos efectiva es la selección de definiciones.

PALABRAS CLAVE
Categoría gramatical; vocabulario; actividad de aprendizaje; español; español como segunda lengua

1. Introduction

Numerous studies focusing on first language (L1) acquisition have demonstrated how word class affects the acquisition process (e.g., Braine 1987; Gerken et al. 2005; Mintz 2006). It is widely accepted that nouns are the first word class acquired in L1 (Kim et al. 2000; Bornstein et al. 2004; Gentner and Boroditsky 2009; Li and Fang 2011), closely followed by verbs. Conversely, adjectives and adverbs tend to be acquired at a later stage.

Nouns have a greater perceptual learnability. Thus, it is reasonable to posit that, in human language, references to the word are introduced first and relations between references are introduced later, providing semantic and syntactic frames to aid the mapping of other word classes and their meanings (Gentner and Boroditsky 2009). The bias towards noun acquisition, however, is often cited in literature questioning the noun-first hypothesis. Firstly, the frequency or saliency of

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a word class in the input may result in a word being acquired more easily and thus it is not restricted to nouns. Secondly, the literature is often limited to Indo-European languages (Caselli et al. 1995; Choi and Gopnik 1995; Tardif et al. 1997; Maratsos 1998; Naigles and Hoff-Ginsberg 1998; Polinsky 2005). Nonetheless, most research shows that nouns are the most easily acquired word class in L1 as well as the most frequently used (Nelson 1973; Huttenlocher 1974; Gentner 1982; Li and Fang 2011). This investigation focuses on whether noun bias occurs in the Second Language (SL) acquisition process but to date research is still scarce and relatively little is known about word class acquisition in SL (Zyzik and Azevedo 2009). As such, David (2008) has shown that learners vary the nouns they use to a larger extent than verbs and suggested that it would be useful to test whether learners are mostly taught nouns instead of verbs, at least at an earlier stage of the acquisition process.

Studies have focused on two fields; firstly, the explicit instruction of word class and derivative forms (Nation 2000, 2001; Morin 2006; Salazar 2009; Friedline 2011; Sánchez Gutiérrez 2013); secondly, the difficulties of acquiring consistent word class knowledge. Similarly, Schmitt and Zimmerman (2002) have shown that learners have partial knowledge of the derivatives; Watts (2008) focused on the concept of "lexical gain" defined as gaining word class and word meaning; Zyzik (2009) and Zyzik and Azevedo (2009) pointed out the difficulties in recognising derivational suffixes that clearly mark word class, analysing word class errors in productive and receptive activities. Nevertheless, to date there is no data available that examines whether any word class is learnt earlier than others in SL.

It is important to emphasise that the issue with word classes extends beyond its conceptualisation. Even when SL learners are able to distinguish word classes in a specific activity, the main problem is learning how categories work syntactically and being able to recognise morphological markers and distributional regularities. Nation (2001, 23–59) points out "words are not isolated units of language" but they are systems of knowledge. Thus, there are "many degrees of knowledge." Nation identifies the aspects involved in knowing a word, which are: (1) form (spoken, written and word parts); (2) meaning (form and meaning, concepts and referents, and associations); and (3) use (grammatical functions, collocations and constraints on use (register, frequency). Also, by applying receptive and productive knowledge to each aspect, this totals 18 types of knowledge.

In this sense, Zyzik (2010) finds that students may be able to learn the meaning of a word, but they do not understand its syntactic value. As they begin their SL studies, they do not have a sound knowledge of syntax, which leads to mistakes when they have to use the language. In other words, word class information is not automatically transferred. In fact, some words may exist in our mental lexicon without being categorised according to word class (Zyzick 2010), and we can study the ability to infer this without knowing the meaning (Watts 2008).

Recent studies converge on the difficulties involved in accurate word class identification. Although students may learn the word meaning quite easily, they often struggle with the identification of its syntactic slot. Even adult native speakers are sometimes unable to label a word or explain their knowledge of word class. The question that subsequently arises is whether explicit language indeed mediates the acquisition of word class and to what extent this occurs. In this regard, some studies try to explain how explicit teaching determines word class acquisition (Morin 2006; Salazar 2009; Friedline 2011; Sánchez Gutiérrez 2013).

If we assume categorising new words is a matter of abstracting regularities from the SL input and deriving word class information from L1, there are three factors that we have to consider for the purposes of this research. Firstly, the use of pseudo-words is crucial; by creating artificial language stimuli, we can be sure that participants certainly do not know them. Secondly, if a word has an unambiguous translation equivalent in L1, it will be easier to acquire it. Third, word class can be determined by its distributional information. In this sense, there are several linguistic factors to consider. Labelle (2005) emphasises that we know the word class not because we look it up in a dictionary but because: (1) the word occupies a particular position in the sentence; (2) the word determines a range of syntactic functions; (3) the word co-occurs with a particular group of words; and (4) the word requires or accepts only one particular kind of inflection.

Another aspect to consider when reviewing relevant literature is that most studies explore word class acquisition processes indirectly. While these studies focus on other aspects of acquisition, they provide information about word class learning, but they do not centre on studying acquisition differences in SL learners focusing on word classes. In a similar vein, our research project is focused on the efficiency of three learning activities. Indeed, its main purpose is not to measure syntactic knowledge but rather to establish whether participants learn the meaning of a word. Nevertheless, we will measure the way in which they learn word classes in the vocabulary acquisition process. Our data also allows us to explore whether there is a link between learning the meaning of a word and learning its word class.

In fact, regarding the Spanish language, Matanzo (1991) and Reyes (1995) studied which word class is acquired faster and the effectiveness of learning vocabulary activities in L1 acquisition. Matanzo showed that nominal categories—nouns and adjectives—are acquired faster, although there is no significant difference in her average results. Reyes noted that in L1 learners, nouns, adjectives and adverbs are acquired more easily than verbs, but that there is no significant difference in term of the ease with which they are acquired. Moreover, conclusions are not drawn as to whether the learning of word classes is linked to a specific learning activity.

Research to date notes that noun dominance occurs in initial SL learning as well as in the L1 learning process particularly with regards to specific nouns and cognates (Sökmen 1997; Jarvis 2000). Nevertheless, to date there are few studies that focus on which word class is learnt first in SL. In Spanish as SL, Palapanidi and Agustín (2014) found that nouns are the most frequent word class in the output of Greek students of Spanish, although nouns are also more difficult to command. These results are consistent with L1 findings. Meanwhile, San-Mateo (2005, 2016) studies the acquisition of word class with regard to the effectiveness of vocabulary learning activities with contrasting results; the adverb is the word class that SL students acquire faster, requiring a lower number of expositions. The unexpected results of San-Mateo can be explained because the amount of target words of each class was not equal.

Previous research is not developed enough to explain the effect of the word class factor on SL learning. Therefore, this study aims to shed light on the issue of how word classes are acquired, as well as the effectiveness of the learning activities. Many SL studies have delved into the efficiency of different learning activities in lexical acquisition. All of them concluded that productive activities were the most efficient as shown in Hulstijn and Laufer (2001), Browne (2003), Laufer (2003), Webb (2005), Kondo (2007), Keating (2008), Kim (2008), Agustín (2009), Pichette et al. (2012), and San-Mateo (2016), among others.

First of all, we measure the effectiveness of three activities: definition-choosing, gap-filling and sentence-writing. According to Hulstijn and Laufer (2001), word retention is linked to the amount of task-induced involvement load. In the same line, the cognition hypothesis argues that there is a higher likelihood that activity complexity is an important variable to be taken into account and predicts that more learning and retention will take place as a consequence of complex activity performance (Robinson 2005). On the other hand, each one of the activities taps into different aspects of knowing a word (Nation 2001). The three activities included here explore the meaning aspect, specifically the connexion between form and meaning—definition-choosing and gap-filling activities only receptively, but sentence-writing activity, also productively. Also, the gap-filling activity explores the use aspect—grammatical functions and collocations, from a receptive point of view, while sentence-writing activity does so from both receptive and productive points of view. As a result, we have to bear in mind that we are measuring different aspects of knowing a word; in the case of definition-choosing and gap-filling activities, only receptive knowledge, but in the case of sentence-writing activity, receptive and productive knowledge of the aspects we referred to above.

Thus, the present study expects the sentence-writing activity to be the most effective activity for learning new words, because it requires a higher involvement load and complexity (Hulstijn and Laufer 2001; Robinson 2005), and the level of knowledge of the words is higher (Nation 2001). On the other hand, the definition-choosing activity requires a lower involvement load. Nevertheless,

our purpose is not only to confirm these hypotheses; we measure the effectiveness of every learning activity in each word class, and we take into account the inflectional paradigm in Spanish.

2. Present study

This study aims to determine which word class is most easily incorporated into the SL student's short-term memory through a specific learning activity. In our case, we are working with learners of Spanish as SL, so it is important to bear in mind how words in each class function grammatically.

Firstly, nouns are marked morphologically for gender [+/– feminine]. They are either masculine or feminine. Many masculine nouns end in -o and many feminine nouns in -a, but there are exceptions such as *mano* (hand.FEM) or *problema* (problem.MASC). There are two levels of gender specification: grammatical and semantic (Antón-Méndez et al. 2002). Nouns referring to animate beings are mostly semantically meaningful: *niño* (child.MASC) refers to a male and *niña* (child.FEM) to a female. But gender for nouns referring to objects is arbitrary: *casa* (house.FEM) and *libro* (book.MASC). There are also invariable nouns identical in both genders. Thus, sex is a matter of semantics or biology and gender is involved in syntax-dependent agreement (Harris 1991).

Nouns are also marked for number [+/– plural] by adding -s to singular nouns and -es to nouns ending in a consonant: *pianos* (piano.PL) and *ordenadores* (computer.PL). There are also exceptions such as nouns ending in a consonant that add -s (*icebergs*/**iceberges*) or invariable nouns (*crisis*).

The phenomenon known as *agreement* establishes a direct grammatical and semantic connection between word classes. Gender agreement is required between nouns and their adjectives, determiners, and quantifiers. It means that a noun as *libros* (books.MASC&PL) takes adjectives, determiners, and quantifiers which are masculine and plural: *esos libros rojos* (those red books). Thus learners need to identify the gender of nouns to mark gender agreement in the other components of a clause.

Secondly, number agreement also holds between nouns and verbs. Spanish is a pro-drop (pronoun-dropping) or null-subject language whose grammar facilitates the omission of pronouns and shows rich verbal agreement inflection. Therefore, verbs are marked for person, number, tense and mood with a final inflection (*leo* - I read; *leemos* - We read). Thus pronoun can be overtly realized or not: *(Yo) estoy leyendo* - *(I) am reading.

The fourth word class, adverbs, is the only invariable class. Adverbs modify a verb, and adjective or another adverb, but they do not apply agreement.

The aim of this study is to investigate the relationship between the vocabulary learning activity and the word class in SL, and to verify whether any particular activity facilitates learning each word class. The research questions are the following:

(a) How does word class—noun, adjective, verb and adverb—and morphological variations affect learning new words in a SL?
(b) Which learning activity—definition-choosing, gap-filling or sentence-writing—is most effective for learning words of each class? Is sentence-writing the most effective activity for the learning of all word classes? Or is there a learning activity which is especially appropriate for the recall or recognition of words of any class? Since the load of inflectional paradigms for each word class is different (from higher to lower load: verbs, adjectives and nouns, and adverbs), are the learning activities that tap into more aspects of knowing a word, receptively and productively, more effective for learning the word classes with more paradigm forms?

3. Method

3.1. Participants

292 students of Spanish as SL (n = 100 males; 192 females) participated in the study. All were enrolled in intermediate level—B1, according to the *Common European Framework of Reference for Languages*

(CEFR) (Council of Europe 2002)—courses in Brazil at the Instituto Cervantes in Sao Paulo, Universidade Federal, Universidade Estadual, and Instituto Federal in Paraíba. They range in age from 15 to 60 years, and 80.14% were between 15- and 30-years-old. In the pre-study questionnaire, all indicated Portuguese as their native language, 50.34% participants study only Spanish as SL, 32.53% also learn another language in addition to Spanish, and 17.12% more than one.

3.2. Materials

This study is a repeat of three research projects carried out with native speakers of English (Coomber et al. 1986) and Spanish (Matanzo 1991; Reyes 1995). Later San-Mateo (2005, 2016) replicated this methodology with learners of Spanish as SL adopting a shorter version of the learning activities and list of words described in Matanzo (1991). Such consistent application is representative of its methodological reliability.

Vocabulary learning activities were created as a result of those prior studies, and are commonly included in textbooks, workbooks, and in the SL classroom. There are three: (1) an activity requiring students to identify the appropriate definition of a given word; (2) a gap-filling activity; and (3) an activity requiring participants to write sentences using the target word. The learning activity was composed of 12 separate questions (one for each target word) of one kind of activity, and the vocabulary test had three sections of 12 questions each ($12 \times 3 = 36$). In each section, one of the learning activities was practised. The type of task from the learning activity and the test was the same. A sample is provided in the Appendix.

A glossary was created to present words to participants. It is consisted of two kinds of words: 12 low frequency Spanish words (fillers) and 12 pseudo-words (target words), which were set up following the phonological patterns of Spanish. Only these target words were included in the learning activities and the test: they were the words to be learned and measured. Real words were included in glossary, so any of them could be recognised by participants and they did not lack motivation.

Testing pseudo-words instead of low frequency words has two main advantages. First of all, it is the only way to be sure that participants are not aware of them, which increases the internal validity of the experiment (Nation 2000, 7; Nation and Webb 2011, 265). Therefore, it was not necessary to use a previous test to ascertain whether the participants knew any of the words (Webb 2005, 37). On the other hand, the obvious disadvantage of using pseudo-words is that participants do not expand their vocabulary in the SL as a result of this investigation. In order to minimise this drawback, there were 12 real words that they could learn. We also considered the differences in the processing of words and pseudo-words, which might affect the results. Newman and Twieg (2001) noted that pseudo-word auditory processing generated more activation within the posterior cortical regions compared to real word processing. Conversely, Greene (2004, 259) studied the *pseudo-word effect* noting the importance of frequency judgments and forced-choice recognition.

All the 24 words have six letters, no diacritical markings such as accents, and very narrow meaning. There are six words from each class: three fillers and three target words. The target words are the following. Nouns are *sotiro* (masculine)*, talefa* (feminine) and *zienga* (feminine); adjectives are *barmil, catilo/-a* and *diforo/-a*; verbs are *ecivar, letaer* and *ronoar*; and adverbs are *jotone, nesoal* and *urjale.* The fillers are: *envase* (masculine), *muleta* (feminine) and *viruta* (feminine) as nouns; *dorsal*, *inicuo/-a* and *pecoso/-a* as adjectives; *gotear*, *pactar* and *ubicar* as verbs; and *adrede*, *aprisa* and *hogaño* as adverbs. Only *barmil, dorsal* and *pactar* come from Matanzo's glossary (1991, 94–96) because Matanzo's distribution of the syllabic structure frequency did not reflect current oral Spanish (Moreno et al. 2006). The explanation for this discrepancy is found in the criteria she adopted to choose and create words. They were required to contain two syllables and six letters, so the only way to fulfil this requirement was to use CVC, CCV, CVV, CVVC or CCVC syllables; and they do not reflect typical consonant and vowel distribution in Spanish words. In order to be more accurate, we have not followed the two syllable criteria—instead we used the more frequent syllabic structures, which are CV and CVC, and avoided less frequent syllables, i.e., CCVC, CCV, CVVC and CVV.

Table 1 displays no major statistical differences between syllable structure from Moreno et al. (2006) and our glossary.

Conversely, the 12 fillers have been chosen carefully looking at several frequency lists (Alameda and Cuetos 1995; RAE 2008; Davies 2002, 2016). Their standard frequency in the CREA list (RAE 2008) is less than seven (maximum frequency = 65,545.55), resulting in a very low frequency (1%). The standard frequency of half of the words is between 1.89 and 6.75 meaning that they occurred more frequently than the other six, in order to provide participants with recognisable vocabulary for motivational purposes. Word frequencies have been checked in other lists: *dorsal, muleta, ubicar, pactar, envase* and *aprisa* appear in at least three lists (Table 2) among the most frequent items; and *hogaño, pecoso, gotear* and *viruta* are less common items appearing in all four frequency lists.

In order to study the acquisition of word class in SL, we have changed the proportion of each word class in line with Matanzo (1991) and San-Mateo (2016). Matanzo worked with 20 target words: ten nouns, five adjectives, four verbs and one adverb; and San-Mateo (2016) maintained the same proportion with ten target words. We followed an equitable distribution pattern: six words of each class, three low frequency words and three pseudo-words, so that results can be compared more consistently and rigorously.

3.3. Procedure

Data collection took place in several classes at the Instituto Cervantes in Sao Paulo, Universidade Federal, Universidade Estadual, and Instituto Federal in Paraíba (Brazil). The procedure was first used by Coomber et al. (1986), and later by San-Mateo (2016). After signing consent forms, the glossary was distributed among the participants and presented to the participants by reading the words and their meanings aloud. Students were then randomly assigned one of the learning activities; 96 participants practised the definition-choosing activity; 97 participants were trained with the fill-gap activity; and 99 participants practised the sentence-writing activity. The learning activity was composed of 12 questions and students were given 45 seconds[1] in which to complete them. When the time had elapsed, the researcher read aloud the right definition of the word as feedback so that participants could check the answer. Participants repeated the learning activity twice, but the use of the glossary was only allowed during the first attempt. Thus they were exposed twice to target words, the effort being greater during the second attempt because they did not have access to the glossary.

After the learning activity, participants filled out a language background and personal information questionnaire (during approximately 5 minutes) as a distraction to avoid recency effects that would favour the last word of the sequence (Gavett and Horwitz 2012). The same test was then administered to all the participants for 15 minutes. Twelve questions of each learning activity had to be answered, so participants had to give answers in the three types of activities: one was the same as their learning activity, and the other two were different. The session lasted for a total 45 minutes.

3.4. Data analysis

Word class was the variable we considered and the independent variable was the learning activity. The analysis was performed to test word class items, in order to determine whether there was evidence that any word class is incorporated into the SL learner's mental lexicon more easily. For example, morphological variation and combination possibilities of different word classes were analysed to ascertain whether this would make recall or recognition more difficult or facilitate it. Also, this would demonstrate whether learning activities influenced the acquisition of each word class.

Table 1. Distribution of syllable type frequencies in Spanish oral corpus (Moreno et al. 2006) and in our glossary.

	.CV.	.CVC.	.V.	.VC.	.CVV.	.CVVC.	.CCV.	.CCVC.
Moreno et al. (2006)	51.35	18.03	10.75	8.6	3.37	3.31	2.96	0.88
Glossary	66.18	11.76	7.35	8.82	1.47	1.47	2.94	0

Table 2. Frequency of fillers at several lists and corpus.

Fillers	Word class	Standard frequency in CREA (RAE 2008)*	Frequency band at Alameda and Cuetos (1995)**	Frequency at Davies (2002)***	Frequency at Davies (2016)***
Dorsal	Adj	6.75	6	153	6,191
Muleta	N	6.5	4	97	2,874
Ubicar	V	6.4	1	101	26,101
Pactar	V	4.6	8	57	4,138
Envase	N	4.43	1	108	10,748
Aprisa	Adv	1.89	7	182	1,210
Adrede	Adv	1.19	6	83	1,855
Viruta	N	0.84	1	24	582
Gotear	V	0.47	1	19	378
Inicuo	Adj	0.39	5	133	1,087
Pecoso	Adj	0.36	1	24	460
Hogaño	Adv	0.33	2	44	144

Note: *0 = lower frequency. **1 = lower frequency band; 4,738 = higher frequency band ***1 = lower frequency band.

To score the test, approaches from similar studies were followed (Hulstijn and Laufer 2001; Laufer 2003; Webb 2005; Folse 2006; Keating 2008; Agustín 2009; San-Mateo 2016). Each correct answer scored one point while incorrect answers and unanswered items earned no points. Here, we were evaluating the result, and not the learning process, so there was no difference between having made the effort to answer the item (and having done it wrong) and not having answered it. In every section of the test, the highest possible score totalled 12 points; then the average was calculated. Therefore, the maximum score from each word class was 3 (as there are three target words of each class).

In the case of multiple choice activities (definition-choosing and gap-filling), there was only one valid answer. For the sentence-writing activity, the following criteria were established to make the marking as objective as possible taking into account previous studies (San-Mateo 2005): orthographic, morphological and syntactic errors were never penalised, and the answer was considered valid even if the pseudo-word was not within the sentence provided, but the meaning was clearly known or a synonym was used instead. The challenge was to identify whether the subject knew the meaning of the pseudo-words rather than having knowledge of syntactic structures. Scores were processed by IBM SPSS Statistics for Windows (IBM Corp. 2016) to calculate the statistical data.

4. Results

4.1. Descriptive statistics

The focus of this study was to explore the average of successfully recalled or recognised words by word class, since the objective was to analyse the possible relationship between the word class variable and the number of words learnt. First of all, the general analysis is explained. It showed that 74.8% of target words are recalled or recognised, i.e., 8.97 words out of every 12 (Table 3), which was the maximum score. Small standard deviation means that the participants' ability to complete the activities was homogeneous.

4.2. Results for word class variable

Next we studied the possible link between morphological variations of word classes and their learning. The dependent variable of the analysis was the number of words learnt. The number of nouns,

Table 3. Mean and standard deviation of test scores.

N	Mean*	Standard Deviation	Standard Error
292	8.97	3.01	0.18

Note: *Maximum score = 12

Table 4. Mean and standard deviation of word class.

Word class	N	Mean*	Standard Deviation	Standard Error
Noun	292	2.3733	.76353	.04468
Adjective	292	2.3345	.84618	.04952
Verb	292	2.2694	.77499	.04535
Adverb	292	1.9977	.89843	.05258

Note: *Maximum score = 3

adjectives and verbs recalled or recognised was very similar (2.37, 2.33 and 2.27); and the number of adverbs was lower (1.99). Standard deviation between 0.7 and 0.8 means that the participants' ability to learn words of four classes was homogeneous. Mean scores are listed in Table 4 and presented graphically in Figure 1.

The analysis of variance[2] determined significant differences between the number of words recalled and those recognised of each class: $F(3, 1164) = 12.399$, $p = .000$. Results of post hoc multiple comparisons (Games-Howell as variances were unequal) indicated that only between adverb and the other three word classes' scores ($p = .000$; $p = .000$; $p = .001$) were there significant differences. The comparison between the recalled and recognised nouns, adjectives and verbs did not reach statistical significance, as the p values were higher than 0.05 ($p = .929$; $p = .404$; $p = .767$), which means there was no difference in learning new words of these three classes.

4.3. Results for the learning activity variable

The next step was to consider the results for each of the three activities. The learning activity was the independent variable, and the dependent variable was the number of words learnt. As shown in Table 5, the sentence-writing activity is the most effective. Participants prepared to complete this activity recalled or recognised 10.45 (87.09%) words; and the standard deviation is very small, i.e., participants' ability to complete this activity was homogeneous. Participants who practised the definition-choosing and gap-filling activities recalled or recognised around eight words (67–72%). Additionally, the variance analysis determined a significant difference between participants who

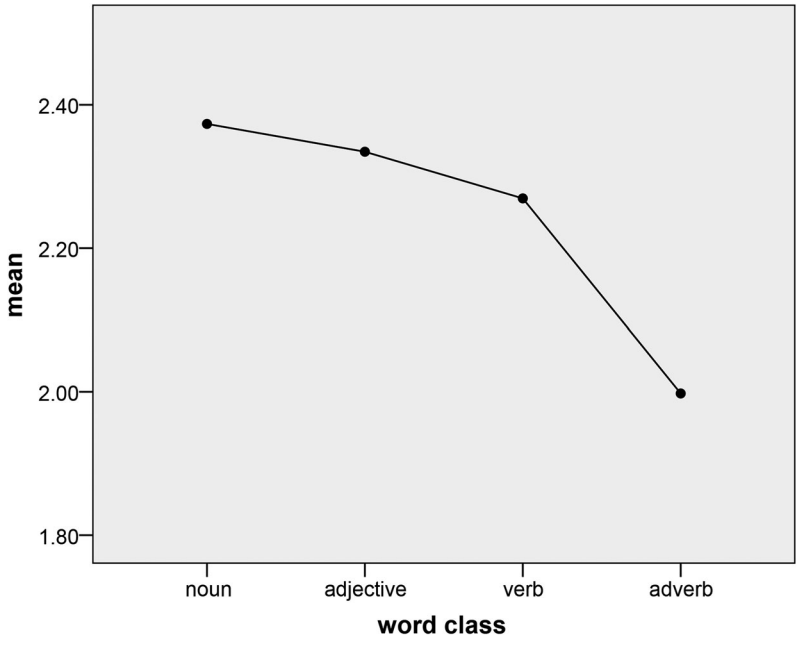

Figure 1. Mean of word class variable.

Table 5. Mean and standard deviation of test scores considering the learning activity.

Learning Activity	N	Mean*	Standard Deviation	Standard Error
Definition-choosing	96	7.76	3.21	0.33
Gap-filling	97	8.67	3.18	0.32
Sentence-writing	99	10.45	1.80	0.18

Note: *Maximum score = 12

trained with the different activities: $F(2, 289) = 23.306$, $p = .000$. Results of post hoc comparisons (Games-Howell as variances were unequal) indicated that sentence-writing activity yielded significantly better scores than the other two activities ($p = .000$; $p = .000$). On the other hand, the comparison between the gap-filling and definition-choosing activities did not reach statistical significance ($p = .124$), which means there was no difference in the outcome of learning new words if one of these two activities were practised.

For our purpose of analysing which learning activity was most effective in recalling and recognising each word class, an analysis of variance was performed taking into account the learning activity (independent variable) and word class (dependent variable) (Table 6).

When the definition-choosing activity was practised, the analysis of variance determined a significant difference between recalled or recognised words [$F(3, 380) = 3.437$, $p = .017$]; and post hoc comparisons (HSD Tukey's test was performed as variances were equal) confirmed the statistical significance just between adverbs and nouns ($p = .024$). Secondly, when gap-filling and sentence-writing activities were practised, also the analysis of variance determined a significant difference [$F(3, 384) = 6.546$, $p = .000$; $F(3, 392) = 5.281$, $p = .001$]; and post hoc comparisons (Games-Howell's test was performed as variances were unequal) confirmed the statistical significance between adverbs and nouns ($p = .001$; $p = .002$) and also between adverbs and adjectives ($p = .002$; $p = .019$). In short, there was a significant difference between learnt adverbs and nouns when participants practised with any of the three learning activities, and also between adverbs and adjectives when they practised with gap-filling and sentence-writing activities. Now we will analyse the effect of the three learning activities in each of the word classes.

Firstly, more nouns were recalled or recognised when sentence-writing (2.717) and gap-filling activities (2.337) were practised (Table 6). The analysis of variance determined a significant difference between the number of nouns recalled [$F(2, 289) = 21.003$, $p = .000$]. Then post hoc comparisons (Games-Howell's test was performed as variances were unequal) demonstrated significant differences between learning nouns using sentence-writing and the other two activities: gap-filling ($p = .000$) and definition-choosing ($p = .000$). This means there was a difference in the outcome of learning nouns if the sentence-writing activity was practised.

When the learning activity was sentence-writing, more adjectives were recalled or recognised: 2.67. This is followed by gap-filling (2.313) and definition-choosing (2.010) activities (Table 6). The analysis of variance determined a significant difference between the number of adjectives learnt [$F(2, 289) = 20.027$, $p = .000$], and post hoc comparisons (Games-Howell's test was performed as variances were unequal) found significant differences between learning adjectives using sentence-writing and the other two activities: namely, gap-filling ($p = .000$) and definition-choosing ($p = .000$), and also between gap-filling and definition-choosing activities ($p = .035$). This means there are two activities (sentence-writing and gap-filling) that facilitated learning adjectives.

Table 6. Results for word class and learning activity variables.

	Definition-choosing				Gap-filling				Sentence-writing			
	N	Mean	SD	SE	N	Mean	SD	SE	N	Mean	SD	SE
Noun	96	2.056	.86	.09	97	2.337	.80	.08	99	2.717	.42	.04
Adjective	96	2.010	.88	.09	97	2.313	.79	.08	99	2.67	.80	.08
Verb	96	2.007	.92	.09	97	2.168	.90	.09	99	2.623	.56	.06
Adverb	96	1.691	.96	.10	97	1.849	.96	.10	99	2.441	.64	.06

Thirdly, more verbs were recalled and recognised when the learning activity was sentence-writing (2.623), followed by gap-filling (2.168) and definition-choosing (2.007) activities (Table 6). The analysis of variance determined a significant difference between the number of verbs learnt [$F(2, 289) = 15.320$, $p = .000$], and post hoc comparisons (variances were unequal so Games-Howell's test was used) demonstrated significant differences between learning verbs using sentence-writing and the other two activities: gap-filling ($p = .000$) and definition-choosing ($p = .000$). This means the sentence-writing activity facilitated learning verbs more than the other two activities.

More adverbs were recalled or recognised when the activity was sentence-writing (2.441). The second most when gap-filling was practised (1.849), and the least efficient activity was definition-choosing (1.691) (Table 6). The analysis of variance determined a significant difference between the number of adverbs learnt [$F(2, 289) = 21.681$, $p = .000$]. Then post hoc comparisons were conducted using the Games-Howell's test because variances were unequal. Significant differences were found between learning adverbs using sentence-writing and the other two activities: gap-filling ($p = .000$) and definition-choosing ($p = .000$). This means the sentence-writing activity facilitated learning adverbs more than the other two activities.

In summary, in all word classes sentence-writing was the most effective activity, followed by gap-filling, and finally the definition-choosing activity (Figure 2). Differences were significant in nouns, adjectives, verbs and adverbs learnt when writing sentences in comparison with the other two activities. In the case of adjectives, differences were also significant between the gap-filling and the definition-choosing activity.

5. Discussion

With respect to the first research question—concerning the effect that word class and morphological variations have on the learning of new words in a SL—the results indicate that the

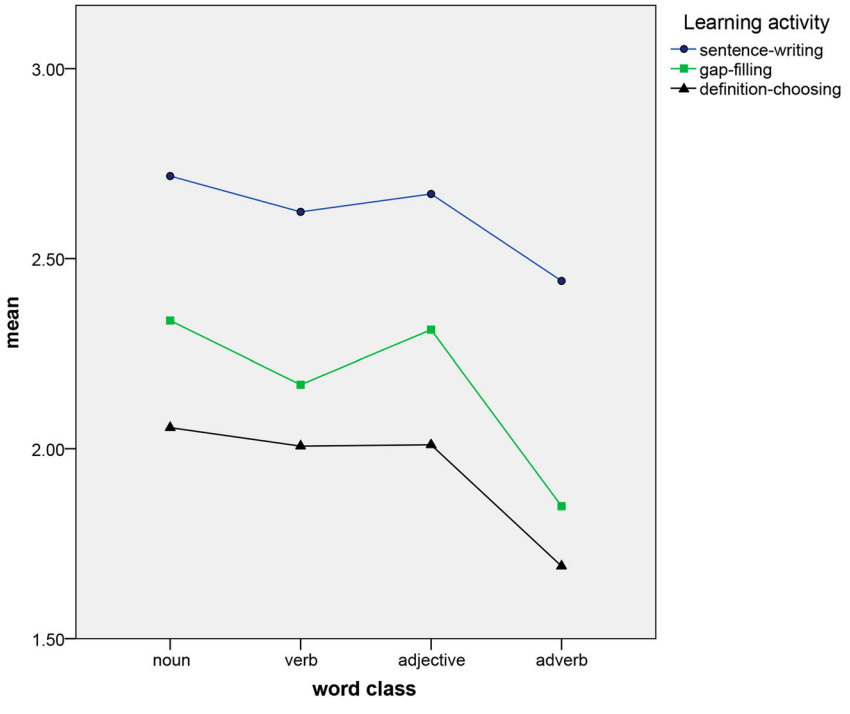

Figure 2. Mean of word class and learning activity variables.

participants were able to recall or recognise more nouns than adjectives, verbs, and adverbs, after having been trained with the vocabulary learning activities. According to this research, nouns, a morphologically rich word class, is the easiest to recall or recognise; and adverbs, a non-inflected word class, is the most difficult.

This noun dominance agrees with most prior studies in L1 and SL. Native speakers of Spanish learn first nouns and adjectives according to Matanzo (1991) and Reyes (1995), and in SL, Palapanidi and Agustín (2014) found nouns are also the most frequent class in Greek students' output. In our study, we do not analyse lexical errors produced by students, so we cannot confirm the assumption that nouns constitute the word class where most lexical errors are made, but our results do confirm more nouns are acquired in SL.

The unexpected results of San-Mateo (2005, 2016) showed that adverbs (the only non-inflected word class) were the most recalled or recognised class. This may suggest a difference in word class acquisition between native and non-native speakers. But there is an important difference between our study and those that have researched this apparent discrepancy: that is, the quantity of words drawn from each word class. The number of target words from each class in San-Mateo's study was not equal, and this lack of symmetry could have been a variable. Nonetheless, the contrast between the results of this study with those of previous studies confirms the importance of using an equitable distribution pattern in the glossary. Working with the same amount of words of each class has enabled us to achieve a more consistent and rigorous data set.

With regard to the use of pseudo-words, we can be sure that none of the students knew the words we provided in the test, which validates our results (Nation 2000; Nation and Webb 2011); and the pseudo-word effect has not been a determining factor because very low-frequency words have also been included in the glossary.

The second research question addressed the relationship between vocabulary learning activities and word class. Firstly, with regard to the use of different activities to learn vocabulary, word retention was linked to task-induced involvement load (Hulstijn and Laufer 2001). Sentence-writing, an activity that involves more mental effort and processing was the most effective activity in recalling and recognising new words; then the gap-filling activity was more effective than definition-choosing, which involves less involvement load. Also, keeping in mind Nation's (2001) classification of types of knowledge of a word, we realize that understanding a question and answering it using the new word requires knowledge of its meaning and its use (grammatical functions and collocations) both receptively and productively. On the other hand, choosing the right definition and filling the gaps require only receptive knowledge of word meaning ; and also filling the gaps requires receptive knowledge of the word use. That is to say the sentence-writing activity taps into more aspects than the other two activities; and the definition-choosing activity taps into fewer aspects.

Thus, the involvement load hypothesis was confirmed as in previous studies (Hulstijn and Laufer 2001; Browne 2003; Laufer 2003; Webb 2005; Kondo 2007; Keating 2008; Kim 2008; Agustín 2009; Pichette et al. 2012; San-Mateo 2016).

When we isolated word class as a factor and we compared the scores of each learning activity, our data clearly showed that sentence-writing was significantly more effective than definition-choosing in recalling and recognising nouns, adjectives, verbs and adverbs. According to these results, the involvement load hypothesis was confirmed for each word class. Therefore, participants who wrote sentences were able to recall and recognise significantly more nouns, adjectives, verbs, and adverbs than subjects who were trained with gap-filling and definition-choosing activities. This means that sentence-writing is the most effective activity for learning any word, regardless of its class and the morphological variation, and not only for learning word classes with more paradigm forms such as verbs, adjectives and nouns. Moreover, we found that when adjectives were learnt, participants were able to recall and recognise a significantly higher number if they had been trained with a gap-filling activity rather than with a definition-choosing activity.

6. Conclusions and future research

The findings of the present study confirm the findings of previous studies that focused on word class acquisition in L1. More specifically, learners of Spanish as SL were able to recall and recognise more nouns than adjectives, verbs, and adverbs. Nouns, a morphologically rich word class, are more easily acquired in the student's mental lexicon. On the contrary, adverbs, a non-inflected word class, are the most difficult to recall and recognise.

The equitable distribution pattern of the glossary, the use of pseudo-words and the inclusion of controlled low-frequency words has produced a more consistent data set that avoids the pseudo-word effect as a determining factor. This is the novelty of this research study with respect to San-Mateo (2016), in addition to the number of participants, their different L1 and some changes in the approach of activities. All these features add rigour and reliability to our results.

As for learning activities, sentence-writing, as expected given its higher involvement load, was the most effective in recalling and recognising new words of any class, regardless of its morphological variation. This activity facilitated learning more than the other two activities.

The finding that learners acquire some word classes more easily in conjunction with specific learning activities must be taken into account when preparing vocabulary teaching materials as well as when we present new lexical input in the classroom. Similarly, according to our results, activities focused on learning new words are helpful in building vocabulary knowledge. The data confirmed that vocabulary enrichment is not only an unconscious process but also that explicit vocabulary instruction is effective (Ellis 1994). Our findings highlight that learners can meaningfully be taught particular skills, so that after having completed specific vocabulary learning activities, they recall and recognise a high number of words. Offering the students activities that focus on grammatical inflection as well as productive activities with high involvement load is effective in learning new words.

Clearly, further research is needed to explore word class acquisition with participants with different L1 and levels of SL. Until more research is undertaken to clarify the relationship between word class, learning activity and the acquisition of lexicon under these conditions, the potential of the results of this study remains untested.

Notes

1. This was the same amount of time provided in similar studies (San-Mateo 2016). Timing learning activities and the test was necessary because we did not want to consider time as a variable. As writing a sentence takes longer than selecting a definition from a list or completing a gap, we have included 20 answer options in each item of the definition-choosing activity, and eight options in each item of the gap-filling activity.
2. The analysis of variance (called ANOVA) is used to analyse differences among group means in sample data. A result is statistically significant when it is considered that unlikely differences have occurred by chance. The probability threshold (p value) or significance level is 0.05, so only when this value is equal or less than 0.05 are the differences between means deemed statistically significant. Post hoc comparisons are then conducted to figure out between which groups differences they are significant, and the significance level is also 0.05. Several post hoc tests (i.e., Scheffe, HSD Tukey, Bonferroni, Tamhane, Dunnet or Games-Howell) are available depending on equal or unequal variances.

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Appendix. Sample of Activities

(1) Escribe la palabra CATILO/-A al lado de la definición que le corresponda.

1. _____ Se dice de la persona valiente, atrevida, que actúa con mucha decisión.
2. _____ Multitud. Gran cantidad de personas, animales o cosas.
3. _____ Inútilmente.
4. _____ Prevenir, precaver.

(2) ¿En qué ejemplo usarías la palabra CATILO/-A? Escribe la palabra en el hueco del ejemplo que le corresponda.

1. Lo hace todo _____; siempre pone mucho empeño y ganas en sus proyectos.
2. No entiendo por qué se esconde, siempre ha sido una chica _____.
3. Creo que sería educado _____ la invitación a la boda.
4. Había muchísima gente en la plaza, una _____.

(3) Contesta a la siguiente pregunta con una oración completa. Utiliza la palabra indicada EN MAYÚSCULAS y subráyala. Tu contestación debe demostrar que conoces el significado de dicha palabra.
Ser CATILO o CATILA en las reuniones de trabajo, ¿te parece positivo o negativo? ¿Por qué?