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THE EFFECT OF WORDTYPE IN THE FIRST STAGES OF FOREIGN LANGUAGE ACQUISITION

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TABLE OF CONTENTS

Acknowledgments	2
Abstract	4
Introduction	5
Effects of Concreteness	6
Effects of Emotional Content.....	9
The present study	14
Method	18
Participants	18
Materials	18
Procedure	21
Results	25
Discussions	35
Conclusion	43
References.....	43
Appendix	47
Appendix I: Pseudowords	47
Appendix II: Spanish words used in each critical condition	48
Appendix III: Meaning of the pseudowords in different files	48

ABSTRACT

The aim of the present study was to investigate whether wordtype influenced the first stages of the acquisition of novel words in a foreign language. Specifically, if emotional content produced any facilitatory effect when learning new words and if this effect was modulated by concreteness. We also aimed to test whether the newly acquired words had the same affective properties and behaved as the emotional words in the first language or the words in proficient bilinguals' second language. We also investigated if these newly acquired words had become integrated in the bilingual semantic system. Finally, we also studied whether individual differences in terms of anxiety levels could have affected the acquisition of emotional words. Using a paired-associate learning paradigm, participants had to learn 48 pseudowords by associating them to their Spanish translations. We used a Translation Production task to assess whether emotional content and concreteness affected the acquisition of the novel words. Furthermore, Pleasantness Rating tasks were administered before and after the acquisition to study if the pseudowords had acquired affective properties. In addition, Free Recall tasks were used to investigate whether the newly acquired pseudowords behaved as words in the first language. Finally, to assess the semantic integration of these novel words, a Translation Recognition task was conducted. All these tasks were done immediately after the acquisition and one week later. Lastly, the effect of individual differences was explored by analyzing the relationship between the results of a questionnaire of anxiety and the performance in the Translation Production and the Free Recall tasks. Overall, the results showed a better performance for concrete words over abstract words in the different tasks. Concerning emotional content, no facilitatory effect of this variable was found in the acquisition of the novel words. However, the affective properties of emotional words seemed to have been acquired and to remain over time. The Free Recall tasks showed that although there were no effects of emotional content, there was a tendency for emotional pseudowords to behave as words in the native language. Furthermore, the overall results of the Translation Recognition task showed that the novel words had been successfully integrated in the semantic system of the bilinguals. The analysis of the errors in this task also showed that the interference produced by associates was bigger for

emotional words what it would indicate a better integration of those emotional pseudowords that had been successfully learnt. Finally, the analysis of individual differences showed no correlation at all.

INTRODUCTION

Second language acquisition has been widely studied over the last decades. How novel words in a new language are integrated with already existing concepts in memory has been the focus of many studies in order to understand the structure and representation of more than one language in memory. Many studies have also proved that novel word forms are integrated in conceptual as well as lexical levels of representations after a short period of training (Altarriba & Mathis, 1997; Davis, Betta, MacDonalds, & Gaskell, 2008; Dobel et al., 2008; Tamminen & Gaskell, 2013). Nevertheless, not all novel words are learnt in the same way and at the same pace. In order to discover which characteristics make it easier to acquire new words, several studies have investigated whether there exist some variables that may influence the acquisition of new vocabulary. For example, a variable related to the type of word that has been demonstrated to affect novel word acquisition is cognate status (Tonzar, Lotto, & Job, 2009; Comesaña, Perea, Piñeiro, & Fraga, 2009; Comesaña, Soares, Sánchez-Casas, & Lima, 2012). Indeed, cognate words (i.e. translation equivalents with a similar orthographic and phonological form in the L1 and L2; for eg.: banana – banana, paper - papel) are learnt faster and more easily than noncognate words (i.e. translations equivalents without any similarity in form between the L1 and the L2; for eg.: book – libro, apple - manzana).

Another variable that has been shown to produce a facilitatory effect when learning a second language is concreteness. Thus, concrete words are easier to acquire than abstract words (Palmer, MacGregor and Havelka, 2013; Mestres-Missé, Fünfte, & Rodriguez-Fornells, 2013).

A third characteristic of words that could modulate the acquisition process of novel words is their emotional content. Nevertheless, just a few studies have investigated the effect of this third variable when acquiring new vocabulary (Altarriba & Basnight-Brown, 2012; Eden et al., 2014; Ferré, Ventura, Comesaña, & Fraga, 2015). The results of those studies

have been inconsistent compared to those obtained with the other two variables, though (see below for a detailed explanation of the studies just mentioned). As concreteness and emotional content are the focus of the present investigation, in the next sections the studies that have dealt with these variables will be reviewed in detail.

Effects of Concreteness

Many studies have demonstrated that concrete words are easier and faster to learn than abstract words. Children learn concrete and abstract words at different rates. Moreover, their first vocabularies are formed mostly of concrete words since these type of words entail information that can be accessed through the senses, i.e.: through world-to-word pairing (Bloom, 2000). Similarly, studies carried out with monolingual adults have shown that the effects of concreteness are not only observed with children but also with adults. For instance, an advantage for concrete words has been demonstrated in tasks such as lexical decision, in which participants have to decide whether the string of letters presented is a word or not (Kroll, & Merves, 1986), and memory tasks (Mestres-Missé et al., 2013; Palmer, MacGregor & Havelka, 2013; Paivio, 1969). Regarding bilinguals, many researchers have reported an effect on concreteness in translation tasks. For example, Van Hell and de Groot (1998) showed there was an advantage of concrete words over abstract words when participants had to translate these types of words into another language, being easier for them to translate concrete words. Finally, other investigations have studied what happens with concreteness when learning a new language. In this respect, De Groot and Keijzer (2000) have demonstrated a facilitatory effect of concrete words over abstract words when learning words in a novel language, being the former more easily acquired than the latter.

Many proposals have been developed to explain the concreteness effect. Among them, there are two theories that have been particularly influential: The Dual-Coding Theory (Paivio, 1986) and the Context-Availability Theory (Schwanenflugel, 1983). According to the Dual-Coding Theory developed by Paivio (1986), there are different semantic-systems for the processing and representation of words. Information about concrete

words is stored in both the linguistic semantic system and the imagistic semantic system. This is because these words are easier to imagine and to associate them to specific objects in the real world. Contrarily, abstract words predominantly activate linguistic representations and have almost no connections to the imagistic semantic system. So, the easiness to learn concrete words over abstract words may be due to the fact that the former accesses information through multiple systems. In contrast to the above account, Schwanenflugel (1983) proposed the Context-Availability Model which denies the existence of multiple semantic systems arguing that comprehension relies heavily on context supplied by either discourse or semantic memory. Concrete words would have stronger associative links to relevant contextual knowledge in semantic memory than abstract words. Thus, the contexts to which they can be attached to in the semantic memory would be denser, while abstract words may need more supportive context in order to acquire their meaning. This would produce the facilitatory effect of concrete words according to this account. Although both theories recognize the advantage in processing of concrete over abstract words, the difference relies on how and where the information is stored and processed. While the Context-Availability model argues for only quantitative differences between both word types within a single representational system, the Dual-Coding model supports the theory of having qualitative differences based on the activity of different systems (Holcomb, Kunios, Anderson, & West, 1999).

Regarding research supporting one of these two views, we can mention the work carried out by Holcomb Kunios, Anderson and West, (1999). These authors used a word-by-word congruency judgement task and recorded the N400 component for concrete and abstract words when comparing anomalous and correct sentences. The authors argued that if concrete and abstract words were processed in a common semantic system, then, the same population of neurons should be activated when these two types of words were being processed. If, however, these words were processed in different semantic systems, distinct population of neurons placed in different parts of the brain should be activated. In line with Paivio's theoretical account, these authors found a different scalp distribution of the N400 component for concrete and abstract words.

On the opposite view, Schwanenflugel and Stowe (1989) studied the influence of sentence context on the processing of abstract and concrete words. In this experiment, participants were asked to complete a word-naming task in which abstract and concrete words were presented in a meaningful or neutral sentence context. Then, they performed a congruency judgement task where they had to judge whether the abstract and concrete words presented at the end of each sentence were meaningful sentence completions. Results supported the context-availability theory since abstract words were comprehended more slowly than concrete words when presented in non-supportive contexts because it was more difficult to retrieve the associated contextual knowledge necessary for comprehension. However, when abstract words were presented in a supportive context, the concreteness effect (i.e., the advantage for concrete words) disappeared.

Having exposed some evidence in favor of the theoretical views exposed above, it is worth mentioning that there is another account which can also explain the concreteness effect in bilinguals: The Distributed Feature Model proposed by de Groot (1992). This model is one of the most influential theories about memory in bilinguals and it proposes that words are represented at a conceptual level as a set of distributed features. When learning a language, novel words may have a set of shared as well as separate meaning components regarding their equivalent translations. The degree of overlap between them may affect the processing of such words. Ferré, Sánchez-Casas, Comesaña and Demestre (2016) showed some evidence supporting this account. In their study, they orthogonally manipulated concreteness and cognate status and they conducted a masked translation priming task in which a lowercase prime word appeared on the screen for 50 ms. after a row of hash marks (#) was displayed. The prime was followed by the target word that was presented in uppercase for 500 ms. Participants were asked to make a lexical decision on the stimuli presented in uppercase. It is worth mentioning that the participants of this investigation were all proficient Eng-Spa bilinguals. The results showed a translation priming effect larger for cognates than for noncognates and modulated by concreteness in some experimental conditions. The authors interpreted these results as evidence of a higher conceptual overlap for concrete and cognate words than for abstract and noncognate words. Although the study just mentioned did not

investigate acquisition but processing of words in highly proficient bilinguals, we believe that the model proposed by De Groot (1992) could also help explain the advantage of concrete words over abstract words in the acquisition of novel words in a new language. Thus, following this line, concrete words may have more conceptual overlapping between the two languages than abstract word which it would produce the former being more easily acquired.

Effects of Emotional Content

Emotionally charged words have been proved to effect processing, attention and memory in monolinguals as well as bilinguals.

In studies with monolinguals, researchers have investigated how the emotional content of words may affect behavioral performance in different tasks. For instance, Algom, Chajut and Lev (2004) used an Emotional Stroop Task in which participants were presented with emotional and neutral words and they had to name the color of the font in which the words were written. The results showed that emotional words produced slower responses than neutral words which it would indicate that words with affective content may capture more attention than neutral ones, slowing down responses. Altarriba and Bauer (2004) demonstrated with a Free Recall task that emotional words were better remembered than neutral words. Likewise, Lexical Decision tasks and Semantic Judgement tasks (i.e., judging if the sentence presented is semantically correct or not) have also been used to prove that emotional words are identified more quickly and accurately than neutral words (Kanske, & Kotz, 2007; Kousta, Vinson, & Vigliocco, 2009; Schacht, & Sommer, 2009).

Regarding bilinguals, many studies have been carried out to investigate the effect of emotional words in the processing of the L2 (see Pavlenko, 2012, for a review). It is believed that emotional vocabulary may be experienced as more intense in L1 than in L2. For example, Dewaele (2004, 2006, 2008) studied bilinguals' use of emotional words using taboo and swearwords and asking them about which language they used to express anger or to swear. The majority of participants considered taboo and swearwords as more

emotionally intense in their L1 than in their L2. They also admitted to express anger in their L1. This author, however, also identified several variables that may influence the use of emotional words in the second language such as age of acquisition, context where the language is being learnt and proficiency. Following this line of research, Caldwell-Harris, Tong, Lung and Poo (2010) investigated whether age of acquisition had any effect in the experiencing of emotional words. They discovered through a Semantic Judgement task that late Mandarin-English bilinguals judged the L1 Mandarin sentences to be more emotional than their counterparts in English, while early Mandarin-English bilinguals judged the two languages as equally emotional.

Other studies in the bilingual field have shown an advantage for emotional words in the native language. For instance, Anooshian and Hertel (1994) tested Spanish-English bilinguals in a word rating task and a surprise recall task and found that emotional words were better remembered only in the participants' first language. Similarly, Degner, Doycheva and Wentura (2012) tested French-German bilinguals in an affective and semantic priming task (the affective priming consists of responses to a target being facilitated by a preceding prime congruent in valence, whereas the semantic priming occurs when the responses to a target are facilitated by a prime semantically congruent). The results showed that semantic priming was observed in the L1 as well as in the L2. Regarding the affective priming, it was mainly observed in the L1, however, there was affective priming in the L2 only in those participants who were living immersed in a L2 context. Thus, the authors concluded that affective priming in a second language depended on language usage.

Contrarily to the studies above discussed, some authors have failed to find the advantage of emotional words in the native language. For example, Ayçiçeği and Harris (2004) found a superior advantage for L2 emotional words in a surprise Recall task. In their study, participants were presented with neutral and emotional words and they were asked to think about the meaning of the words being displayed and to rate their pleasantness. After that, they were given either a Recall task or a Recognition task. The results showed that participants performance concerning emotional words was better in their L2 than in their native language. Furthermore, Eliola, Havelka and Sharma (2007) revealed equivalent

levels of interference in both languages when tested Finnish-English bilinguals in an Emotional Stroop task. Sutton, Altarriba, Gianico and Basnight-Brown (2007), showed a similar pattern of results when testing Spanish-English bilinguals using the same paradigm. In addition, Ferré, García Albea, Fraga, Sanchez-Casa and Molero (2010) proved that proficiency seemed to have a great impact on remembering emotionally charged words. The authors tested 2 different groups of proficient bilinguals (Cat-Spa and Eng-Spa bilinguals) who had acquired their second language at different ages and in different contexts in a rating task and surprise recall task. Their findings showed that emotional words in the second language were processed equally as the emotional words in their first language. Based on what they found, the authors concluded that proficiency played a key role in the processing of emotional words, no matter at what age or in which context the second language had been acquired. In this sense, these results differed from the ones obtained by Anooshian and Hertel (1994) which, using the same memory paradigm, obtained effects of emotional content only in the L1 of participants. A possible explanation for this difference is that the participants used in their experiment were not as proficient as those used by Ferré et al., (2010). Having exposed several studies in the bilingual field, it can be reached to the conclusion that the results found are not very robust. Furthermore, the effect of emotional content may appear in both languages or may be bigger in the first language depending on the paradigm used and the participants' proficiency.

All the investigations reviewed above proved that, in some way, the emotional content of words seemed to modulate language processing in monolinguals and bilinguals. Nevertheless, only few studies have addressed if this emotional content can affect novel word acquisition. According to the proposal of Kousta, Vigliocco, Vinson, Andrews and Del Campo (2011), it should be the case. These authors investigated the processing differences between concrete and abstract words. They sustained that once imageability and context availability are held constant, there is a residual advantage of abstract words over concrete words in word processing. This advantage could be due to the fact that the former are more emotionally charged than the latter. For these authors, concrete and abstract words carry different types of information: sensorimotor, affective and linguistic. The semantic representation of those types of words differs in terms of whether the

sensorimotor or affective information have the greatest weight. Concrete words may rely more on sensorimotor information whereas abstract words may rely more on affective content. Following this idea, it might be predicted that emotional content would facilitate the acquisition of abstract words. Kousta et al. (2011) also posited that words which denote emotional states, moods or feelings may be crucial for acquiring abstract concepts since they may provide an example of how a word can refer to an entity “that is not observable but resides within the organism” (p.25).

Only few studies have been carried out following this line of inquiry. For instance, Altarriba and Basnight-Brown (2012) investigated whether emotional content and concreteness modulated the acquisition of novel words in a new language. In their study, English-speaking monolinguals participants were trained to learn new concrete, abstract and emotional Spanish words via a paired-associate learning paradigm. Then, they performed an emotional Color-Word Stroop Task to investigate whether emotional newly acquired words were processed similarly as emotional words in fluent speakers. In this task, the words recently learnt appeared in different ink colors and participants were asked to press a button denoting the ink color of the words presented. The authors also conducted a Translation Recognition Task to study whether these new words had become integrated in the semantic system of the participants. Here, Spanish-English word-pairs were presented and subjects were asked to press a “yes” button if the words appearing on the screen were the correct translation of each other, or to press a “no” button if they were not. Semantic related words of the newly acquired ones and controls were included in the task. The results showed that the three word-types were acquired differently. In the Translation Recognition Task, the data obtained revealed that all the words had been encoded to some degree since the greatest interference was produced when participants had to reject semantically related words as compared to control words. However, concrete words were responded faster than the other two categories and abstract words were also responded faster than emotion words, this last wordtype having the poorest performance. Regarding the emotional Stroop Task, emotion words produced faster responses than the other wordtypes showing that they did not produce the interference effects (slower responses) that are typical in this task with emotional words when testing either fluent speakers of a first language or proficient L2 speakers. The poor performance

of recently acquired emotional words could be due to the fact that these words have not been widely experienced by participants as those words from their L1 or the words in the second language of proficient speakers, thus, they have not developed rich semantic concepts.

In contrast to the results of Altarriba & Basnight-Brown (2012), Ferré, Ventura, Comeseña & Fraga (2015) found a different pattern in a study carried out with bilinguals learning novel vocabulary in a new language. The main difference with the previous investigation was that these authors manipulated orthogonally the concreteness and affective valence of the words in order to see whether there was any interaction between those variables. In this study, participants were trained to learn novel words in Basque using, as in the above study, a paired-associate learning paradigm in which participants had to associate the Basque words to their Spanish translation. Then, they performed a go/no-go Lexical Decision Task in which participants were presented with all the Basque words recently acquired mixed with some pseudowords for them to decide, for each string of letters presented on the screen, whether it was a learned word or not. The LDT was used to explore whether emotional content produced an advantage in the recognition of recently acquired words as has been observed with words in the native language as well as with words in the second language of proficient bilinguals (Kousta et al., 2009; Ponari, Rodriguez-Cuadrado, Vinson, Fox, Costa, & Vigliocco, 2015). The participants also performed a Translation Production task in which participants were presented with the learned Basque words and they had to produce the correct Spanish translation. Results showed that concrete words were learnt faster than abstract words. Likewise, emotionally charged words facilitated the acquisition of abstract but not concrete words with a bigger effect for negative than for positive words. These findings go along with the proposal of Kousta et al., (2011) since the words that are usually the ones more difficult to learn (abstract words) were benefited from emotional content. Thus, emotional content seemed to reduce the disadvantage for abstract words in the process of learning novel words in a new language. It should be noted, however, that Ferré et al. (2015) did not explore whether the recently acquired words behaved as those emotional words that participants already knew, either in their native language or in their second one. Besides,

they did not show if the new words had been integrated semantically. These two missing points were addressed in the current study.

One last study that is worth mentioning for the present work is the one carried out by Eden et al. (2014) in which participants with low or high scores on trait anxiety were tested using a word-learning paradigm. In this task, participants had to associate the pseudowords to an arousing-negative or a neutral picture. Then, participants rated these novel acquired words in pleasantness rating task and did a translation production task. These tasks were carried out after the learning phase and two weeks later. Their results showed a significant effect of emotional content, being negative words better remembered than neutral words. Importantly, high anxious participants showed a stronger memory bias in their productions and more negative ratings in the pleasantness rating task compared to low anxious participants. In light of these findings, we decided to further explore whether individual differences in anxiety may affect the acquisition of emotional words in a new language.

The present study

Having considered the different variables that can influence the acquisition of novel words, the aim of this study is to further explore whether the emotional content of words can affect the early stages of the acquisition of novel words in a new language and if that effect is modulated by concreteness. In order to do this, we orthogonally manipulated these two variables to be able to see which effects are produced by concreteness and which by emotional content and if there is any interaction between these two factors. We also aimed to explore if the newly acquired words have the same emotional properties and if they behave as the emotional words of the participants' L1 or L2. A third aim was to investigate if these new words have been integrated in the multilingual semantic system of the participants.

We use a paired-associate learning paradigm for the acquisition phase since this method has been proved to be an efficient technique when learning new vocabulary. This is due to the fact that this procedure involves assigning a new name to an already existing

concept (de Groot, & Keijzer, 2000). Participants were presented with concrete, abstract, negative and neutral words. Each word was paired with a pseudoword. We used pseudowords instead of actual words in some other language mainly because this approach ruled out the possibility that any of the participants knew the meaning of the words; on the other hand, it allowed us to create the materials according to some specific criteria, controlling for the relevant variables, and avoiding the possibility that some of the new words were more difficult to learn than the others. Of note, participants believed that they were learning words in Guaraní, an official language from Paraguay.

As we aimed to test whether the wordtype has affected the acquisition of the new words, we conducted a Translation Production task in which participants were given all the pseudowords recently learnt and they had to write the equivalent translations in Spanish.

We also aimed to study whether the words actually learnt had the same affective properties as the words in the participants' native language and if they behaved as such words. In order to test that, participants performed Pleasantness Ratings and Free Recall tasks. Concerning pleasantness ratings, participants performed them before and after the acquisition phase. They did these ratings in three moments, one at the beginning of the experiment when they had not learnt the pseudowords yet, the second one after the acquisition phase and the last one, a week later. The task consisted of rating the new pseudowords in a scale from 1 to 9 (being 1 very unpleasant and 9 very pleasant) depending on how pleasant the pseudowords were for the participants. The reason for doing this was to test whether the ratings of the newly acquired words differed after the acquisition phase and whether negative words became more negative (having lower rating values) than when participants first rated the pseudowords.

Regarding the Free Recall tasks, they were performed after the acquisition phase and a week later. Our aim with this task was to investigate whether emotional words were remembered better than neutral ones, as it has been established in monolinguals and proficient bilinguals (Altarriba, & Bauer, 2004; Ayçiçeği, & Harris, 2004; Ferré et al., 2010). In this task, participants had to write on the computer all the pseudowords they could remember. Of note, previous to the main experiment, we conducted a pilot experiment with the Spanish words used as the translations of the pseudowords to be learned. The

reason was to know if the experimental stimuli selected for this study showed the usual performance with emotional and concrete words in the native language. In this pilot experiment, a different group of participants did the rating task and the free recall task. We hypothesized that if the newly acquired pseudowords acquired the properties of the concept they referred to, then, a major remembering of concrete and emotional words would be expected.

A Translation Recognition Task was also carried out to assess whether the new acquired pseudowords had been integrated in the multilingual semantic system of the participants. This task has been widely used by different researchers to assess the success of novel word learning (de Groot, & Keijzer, 2000). The task consisted of presenting pairs including an acquired pseudoword and a Spanish word for participants to decide whether they were equivalent translations or not. The condition within this task that will allow us to know if semantic integration has been produced is “incorrect translations,” i.e., when the Spanish word and the pseudoword are not equivalent translations. It has been proved that semantically related words produce interference (i.e., longer reaction times and more errors) regarding those words that are already part of the semantic system of a person (Altarriba, & Basnight-Brown, 2012; de Groot, & Keijzer, 2000). For that reason, semantically related words (associates) to those newly acquired words and controls (i.e., unrelated words) were included. These variables will allow us to examine if associates produced any interference in the processing of the pseudowords.

Furthermore, with exploratory purposes, we assessed whether individual differences concerning anxiety may have an effect on the acquisition of certain wordtypes, since it has been found that more anxious people tend to acquire and remember more negative words (Eden et al, 2014). For that purpose, participants completed a questionnaire that measures anxiety, the STAI questionnaire (Spielberger, Gorsuch, Lushene, & Cubero, 1994).

Finally, we were also interested in testing the stability of learning. For that reason, we conducted the same tasks after acquisition and one week later to assess if there was a loss of information between the first and the second session and if that loss was related to a specific wordtype.

So, according to what has been previously exposed and taking into account the revised literature, we make the following predictions:

- In the Translation production task there would be an advantage for concrete words over abstract words in the learning and subsequent processing of words. Furthermore, following the proposal of Kousta et al., (2011), we predicted that if there is actually a facilitatory effect of the emotionality of words; then, emotional words should be better acquired than neutral words but this facilitatory effect would be greater for abstract than for concrete words, making the usual advantage of concrete over abstract words be reduced.

- Regarding the affective properties (emotional content) of words, some differences will be seen between the pleasantness rating tests. As participants had never seen these pseudowords before, the ratings of the first test (Moment 1) would serve as a baseline to compare them to the other Pleasantness tasks carried out after acquisition (Moments 2 and 3) and hence, to prove if, once the subjects had attached a meaning to the pseudowords, pleasantness ratings would change. Being that the case, negative words would show lower ratings than neutral words in Moments 2 and 3, but not in Moment 1. This pattern would indicate that the emotional content of words has been acquired.

- In Free Recall tasks, we predicted that if the newly acquired emotional pseudowords actually behaved as words in the monolinguals' native language or in the second language of proficient bilinguals, then, this type of pseudowords would be better remembered than neutral words.

- Considering the Translation Recognition Task, we also predicted a better performance of concrete words in the correct translations producing lower reaction times and errors. If the emotional content of words had helped acquire the emotional pseudowords, there would be lower RTs and errors with respect to this type of word. Incorrect translations would indicate if the pseudowords were successfully semantically integrated. So, an interference would be observed. This interference would be revealed as higher reaction times and more errors in the semantically related conditions than in the unrelated conditions. Moreover, if the semantic integration were affected by wordtype, the

magnitude of the interference would be higher for concrete and emotional words than for abstract and neutral words.

- Regarding the STAI questionnaire, if individual differences in anxiety modulate the acquisition of novel words, then more anxious people would show a better acquisition of negative words than those who were not so anxious.

- Finally, with respect to the stability of learning, we predicted a loss of information between session 1 and 2. If wordtype affected this stability, we would expect abstract and neutral pseudowords to be remembered the least.

METHOD

Participants

Twenty-five Spanish-Catalan bilingual adults served as participants for this study (21 females and 4 males). Their age ranged between 18 and 35 ($M=21.84$, $SD=3.95$). Most of them were either undergraduate students or workers at Universitat Rovira i Virgili (URV). They were economically compensated in form of a gift card for their participation.

Materials

A set of pseudowords were created based on low frequency Spanish words to be used in the acquisition phase. These pseudowords were formed using a multilingual word generator software called Wuggy (Keuleers, & Brysbaert, 2010). The pseudowords were both orthographically and phonologically legal in the native language of the participants.

After having generated a list of possible pseudowords, a questionnaire containing them all was administered to 20 participants (who belonged to the same population of the participants but who did not take part in the experiment) to see if these pseudowords reminded them of some already existing either Spanish or Catalan word. In order to do that, participants were asked to write down in a sheet of paper provided by the experimenters the Spanish or Catalan word in which they thought after having read each

of the pseudowords. Another questionnaire was provided to a different group of 20 participants in order to check that the pseudowords had no valence for themselves (i.e., that they did not have an emotional content). Participants were told to rate these pseudowords according to their pleasantness using a scale from 1 to 9 being 1 very unpleasant and 9 very pleasant. Those pseudowords for which six participants or more had written the same Spanish or Catalan word in the first questionnaire and those words that obtained a pleasantness rating equal or more than 6 and equal or less than 3.5 in the second questionnaire were excluded from the materials. As a result, we obtained forty-eight pseudowords to be used in the acquisition phase of the experiment.

The pseudowords were paired to 48 Spanish words which were obtained from Guasch, Ferré and Fraga (2015) (see Appendix II). They were all nouns and they were divided into four groups in order to meet four different conditions regarding concreteness and emotional content: concrete negative words, concrete neutral words, abstract negative words and abstract neutral words. Concrete words had levels of concreteness from 5.5 to 7 while abstract words had levels of concreteness from 2.5 to 5.5 in a scale from 1 to 7 (being 1 no concrete at all and 7 very concrete). Concreteness values were obtained from Duchon, Perea, Sebastián, Martí and Carreiras, (2013). With respect to affective properties, we selected negative and neutral words considering valence (how negative or positive a word is) and arousal (how calming or exciting a words is). Negative words had valence values from 1 to 3 in a scale from 1 to 9 (being 1 very unpleasant and 9 very pleasant) and arousal values from 6 to 9 in a scale from 1 to 9 (being 1 very calming and 9 very exciting) whereas neutral words had valence ratings from 3 to 5 and arousal ratings from 1 to 5. The values of the affective variables were obtained from Ferré, Guasch, Moldovan and Sánchez-Casas (2012), Guasch, Ferré and Fraga (2015), and Redondo, Fraga, Padrón, and Comesaña (2007).

In order to select the Spanish words in the four critical conditions, we considered the following variables that are known to affect word processing (see Table 1): age of acquisition (AoA) obtained from Alonso, Fernandez and Díez, (2015); familiarity, obtained from Guasch, Ferré and Fraga, (2015); length, frequency of bigrams and

logarithm of frequency, obtained from the EsPal Subtitle Tokens' Database (Duchon et al., 2013); Normalized Levenstein Distance (which represents the orthographic similarity between the Spanish word and their Catalan translation), was obtained from Guasch, Boada, Ferré and Sánchez-Casas, (2013). We controlled this variable because our participants were bilingual of Spanish and Catalan. Furthermore, as some of the selected words did not have age of acquisition values, a small questionnaire was administered to 15 additional participants to obtain them, using the same instructions as in Alonso, Fernandez and Díez (2014). There, participants had to indicate the age at which they thought they had acquired the different words.

On the other hand, since one of the tasks to be performed by the participants was a Translation Recognition task where it was pretended to generate interference, it was necessary to select a set of words semantically related to the critical stimuli. To that end, we obtained associated words from Fernández et al., (2004). This database also includes the associative strength for each associated word. The associative strength of a word is the capacity of a presented word (stimulus) to remind another one by means of associations (Deese, 1962). It is measured as the percentage of participants that provide a particular word as an associate for a given word (stimulus). Thus, we selected an associated word for each critical stimulus.

	Concrete_Negative	Concrete_Neutral	Abstract_Negative	Abstract_Neutral
Conc	5.90 (0.47)	5.70 (0.70)	3.59 (0.27)	3.54 (0.24)
Img	5.40 (0.87)	5.31 (1.06)	4.22 (0.58)	3.64 (0.81)
Fam	5.13 (0.96)	5.44 (0.40)	5.50 (0.94)	5.66 (0.82)
Val	2.1 (0.52)	4.96 (0.22)	2.09 (0.49)	4.92 (0.39)
Aro	6.40 (0.88)	4.26 (0.33)	6.77 (0.59)	4.21 (1.70)
AoA	7.50 (1.46)	7.20 (1.60)	7.30 (2.02)	7.12 (1.69)
Log_freq	1.41 (0.51)	1.16 (0.49)	1.45 (0.53)	1.51 (0.56)
Long	6.67 (1.67)	6.90 (2.02)	6.90 (1.51)	6.00 (1.12)
Big_freq	3744.53 (2281.62)	4564.71 (3208.96)	5395.39 (3030.99)	4618.85 (2017.15)
NLD	0.64 (0.26)	0.79 (0.28)	0.81 (0.16)	0.70 (0.12)
Ass	0.27 (0.11)	0.25 (0.19)	0.18 (0.11)	0.24 (0.12)

Conc (concreteness from 1 to 7), **Img** (Imageability from 1 to 7), **Fam** (familiarity from 1 to 7), **Val** (Valence from 1 to 9), **Aro** (Arousal from 1 to 9), **AoA** (Age of acquisition from 1 to 11), **Log_freq** (frequency logarithm), **Long** (Length of the word), **Big_freq** (frequency of bigrams), **NLD**

(Normalized Levenshtein Distance: orthographic similarity between the Spanish words and their Catalan translations), *Ass* (associative strength).

We conducted a 2 (concreteness) x 2 (emotional content) ANOVA on the above mentioned variables. The analysis revealed, a significant effect of concreteness on word's concreteness, $F(1,47)=157,094$, $MSE=20.47$, $p<.001$, $\eta^2=0.87$ and imageability $F(1,47)=12.78$, $MSE=9.20$, $p<.001$, $\eta^2=0.72$, which means that concrete words had higher values of concreteness ($M=5.82$) and imageability ($M= 5.39$) than abstract words ($M= 3.56$, $M=3.93$ for concreteness and imageability respectively). There was also a significant effect of emotional content on both, valence, $F(1,47)=183.699$, $MSE=31.72$, $p<.001$, $\eta^2=0.173$, and arousal, $F(1,47)=64.965$, $MSE=22.51$, $p< .001$, $\eta^2=0.347$. Pairwise Bonferroni comparisons showed that negative ($M= 2.1$) and neutral words ($M= 4.9$) were significantly different concerning valence ($p<.001$) and arousal ($M=6.4$ for negative words and $M=4.2$ for neutral words; $p< .001$). There was neither an effect of concreteness nor an effect of emotion in the rest of the variables meaning that they were all matched across conditions (all $F_s<1.68$).

We created four files where all the pseudowords selected were randomly paired to different Spanish words with counterbalancing purposes. Thus, in each file, each pseudoword had a different meaning. For example, “gubra” meant *problema* (problem) in File 1, *brevedad* (brevity) in File 2, *víctima* (*victim*) in File 3 and *microscopio* (*microscope*) in File 4 (see Appendix III).

Procedure

Before doing the main experiment, we conducted a small pilot experiment with a different group of participants in order to know if the Spanish words chosen for the critical conditions showed the typical pattern of findings with words in the native language. The normal pattern in a Free Recall task is that concrete words are better remembered than abstract words as well as emotional words are better remembered than neutral words. The results of this experiment would let us know if the pattern obtained from the recently

acquired pseudowords was the same as the one obtained with the Spanish words. The 26 participants of this pilot experiment were from the same population than the rest of the participants involved in the main experiment. They were asked to rate the Spanish words in a scale from 1 to 9 according to their pleasantness. Immediately after, a Free Recall task was administered, in which they were asked to remember as many words as they could from those they had rated.

Both the pilot experiment and the main experiment followed the ethical guidelines of the Faculty of Sciences of Education and Psychology of the University Rovira I Virgili. In addition, all participants signed an informed consent before starting the experiment.

The main experiment was conducted in two sessions. The first one lasted one hour and 30 minutes and the second one 45 minutes approximately. The time elapsed between sessions was one week. Participants were tested in groups of four in separate soundproof booths and they were randomly assigned to one of the four different files.

Participants were not acquainted with the purpose of the experiment and they were all given the same instructions. They believed they were learning new words in Guaraní, an indigenous language spoken in South America, especially in Paraguay.

First Session

During the first session, the following tasks were carried out in the same order as they are described here:

Pleasantness rating task Number 1

Participants were asked to rate the pseudowords in a scale from 1 to 9, being 1 very unpleasant and 9 very pleasant, according to the pleasantness these pseudowords intuitively produced to them. Although they did not have a specific amount of time to do it, they were told to base their rating on the first impression the pseudowords generated. The questionnaire was displayed on the computer and the pseudowords appeared one below the other. We used a program called Testmaker to create it (Haro, 2012).

Acquisition Task

We used PowerPoint to present the four files where all the pseudowords to be learnt were randomly paired to different Spanish words with counterbalancing purposes. The file given to each participant was also randomly selected.

Before the real task began, a training phase was administered for participants to get acquainted with the different stages of it.

The acquisition task was divided into four different stages. During Stage 1 and 3, the pseudowords were presented one by one followed by their Spanish translation for a period of 50" each slide to allow participants to acquire their meaning. Each slide contained one of the pseudowords and its equivalent translation placed in the centre of the slide in big black letters with white background. Participants were able to read the words as well as to hear them via headphones. During Stage 2, each slide contained one of the pseudowords followed by two different Spanish words, whereas in stage 4 each slide showed one of the Spanish words followed by two pseudowords. In these two stages, participants had to decide in a period of ten seconds which was the correct option and to mark it in a sheet of paper provided for that end. Having passed the time, participants were given feedback showing the correct answer on the screen. They were asked not to correct or mark anything on the sheet of paper once the answer appeared. These activities were done to help subjects to acquire the new pseudowords.

Pleasantness rating task Number 2

Immediately after the acquisition task, participants were asked to rate the pseudowords again in a scale from 1 to 9, as they had previously done.

Free Recall Task

After finishing the pleasantness rating task, participants were asked to write all the pseudowords they could remember from the pleasantness rating task.

Translation Production Task

Having finished with those activities, a different sheet of paper was handed in to the participants with a complete list of all the pseudowords previously seen for them to write the appropriate Spanish translation next to each word.

Translation Recognition Task

This task consisted of recognizing whether the pair of words presented were translation equivalents or not. Three different versions were made for each of the four files. A pseudoword could be followed by 3 possible options: the correct translation, an associated word (semantically related) or a control word (non-semantically related). Each version had 16 words followed by their translation, 16 followed by an associated word and 16 followed by a control word. Participants were assigned randomly to each version. Before the task began, there was a practice block containing four trials. The task was carried out using the DMDX software (Forster & Forster, 2003).

In each trial, there was a fixation cross for 500ms: then, each pseudoword was presented for 250ms followed immediately by a Spanish word which met one of the three conditions mentioned above and which remained on the screen for 500ms more. Participants used a keypad with 2 buttons (a “yes” and a “no” button). They were asked to press the “yes” button if they considered that the Spanish word was the correct translation of the pseudoword shown before or the “no” button if it was not. The “yes” button was pressed with the preferred hand. Reaction times (RT) and errors (%E) were recorded.

Second Session

The procedure of this session was exactly the same as the first session, with the only difference that the Acquisition Task was not conducted this time. Thus, participants did the *Pleasantness Test Number 3*, the *Free Recall task*, the *Translation Production task*¹ and the *Translation Recognition Task*.

By the end of this session, participants completed the STAI, an anxiety-trait questionnaire (Spielberger, Gorsuch, Lushene, 2011) which consisted of 20 questions.

Once the experiment had finished, all the participants were debriefed.

¹The pseudowords in the list appeared in a different order with respect to the first session.

RESULTS

Results were analyzed using the SPSS program. A significance level of $p < 0.05$ was adopted for all tests. One of the participants was eliminated from the main experiment since he had reached less than 80% of accuracy in the Stage 4 of the Acquisition Task.

Pilot experiment: Free Recall of Spanish words

In order to analyze the pilot experiment carried out with the Spanish words used in the critical conditions we conducted a 2 (concreteness) x 2 (emotional content) repeated measures ANOVA. The results showed a main effect on concreteness, $F(1,25)=21.92$, $MSE=54.08$, $p<.001$, $\eta^2=.46$, indicating a better remembering of concrete words ($M=3.03$, $SD=.29$) than abstract words ($M=1.59$, $SD=.19$) as well as a main effect of emotional content, $F(1,25)=10.51$, $MSE=21.24$, $p=.003$, $\eta^2=.29$, being negative words ($M=2.76$, $SD=.26$) better recalled than neutral words ($M=1.86$, $SD=.21$). There was also an interaction between these two variables (see Table 2), $F(1,23)=11.75$, $MSE=10.47$, $p=.002$, $\eta=.32$, indicating that overall negative content benefited only concrete words ($p=.001$ and $p=.327$ for concrete and abstract words respectively).

Table 2: Number of words remembered in each condition in the Pilot experiment (Standard Deviation in parentheses)	
Conc_Neg	3.81 (0.38)
Conc_Neu	2.27 (0.32)
Abst_Neg	1.73 (0.25)
Abst_Neu	1.46 (0.22)
Conc_Neg (concrete negative), Conc_Neu (concrete neutral), Abst_Neg (abstract negative), Abst_Neu (abstract neutral)	

Main Experiment

Acquisition Task

The number of words correctly identified in stages 2 and 4 of the Acquisition Task was analyzed using two separate 2 (Concreteness) x 2 (Emotional content) repeated measures ANOVAs, one for each stage.

In stage 2, there was a main effect of concreteness, $F(1,23)= 6.83$, $MSE=8.76$, $p=.016$, $\eta^2= .23$, which means that apparently concrete words were acquired better than abstract words.

In stage 4, unlike the previous stage, there were no significant effects neither of concreteness nor of emotional content (see Table 3).

Experimental conditions	Phase 2	Phase 4
Conc_Neg	9.71 (2.13)	11.50 (0.78)
Conc_Neu	12.20 (1.93)	11.58 (0.65)
Abst_Neg	9.12 (1.70)	11.33 (1.04)
Abst_Neu	9.58 (2.26)	11.25 (1.11)

Conc_Neg (concrete negative), **Conc_Neu**(concrete neutral), **Abst_Neg** (abstract negative), **Abst_Neu** (abstract neutral)

Pleasantness rating tasks

To analyze all the Pleasantness rating tasks, we conducted a 3 (moment, i.e., when the task was done) x 2 (concreteness) x 2 (emotional content) ANOVA on the pleasantness ratings (see Table 4). The analysis revealed a main effect of emotional content, $F(1,23)=23.38$, $MSE=29.07$, $p<.001$, $\eta^2=.50$, as participants rated negative words as being more negative ($M=4,27$; $SD=.167$) than neutral words ($M= 4,90$; $SD=.138$). Importantly, there was an interaction between moment and emotional content which reached statistical significance, $F(2,46)= 19.34$, $MSE=15.01$, $p< .001$, $\eta^2=.46$. Bonferroni *post hoc* tests on the interaction revealed that Moment 1 served as a baseline since the ratings of neutral ($M= 4,59$; $SD=.13$) and negative words ($M= 4,79$; $SD=.15$) were almost the same ($p=.11$). During the course of the experiment, pleasantness values changed significantly in moments 2 and 3. Overall, negative words were considered less pleasant than neutral words. However, in Moment 2 the difference between negative and neutral

words was higher (M=5.16; SD=.190 for neutral words and M=3.79; SD=.22 for negative words, $p = .001$) than in Moment 3 (M=4.96; SD=.18 for neutral words and M=4.22; SD=.24 for negative words, $p = .004$).

Experimental conditions	Moment 1	Moment 2	Moment 3
Conc_Neg	4.70 (0.87)	3.71 (1.21)	4.17 (1.20)
Conc_Neu	4.53 (0.89)	5.26 (1.03)	4.92 (0.95)
Abst_Neg	4.88 (0.75)	3.87 (1.00)	4.27 (1.22)
Abst_Neu	4.65 (0.72)	5.06 (0.95)	5.01 (0.92)

Conc_Neg (concrete negative), **Conc_Neu**(concrete neutral), **Abst_Neg** (abstract negative), **Abst_Neu** (abstract neutral)

In order to get more information from this task, we analyzed separately the pleasantness ratings of the words that participants did actually acquire and of those that they failed to acquire. For each participant, the words that were considered successfully acquired were only those that he/she had correctly produced in the Translation Production task.

When considering the pleasantness ratings of words that participants did not learn, there was no effect at all with respect to emotional content, $F(1,22)=1.10$, $MSE=1.56$, $p=.30$, $\eta^2=.04$. Furthermore, the interaction between emotional content and moment was not significant either, $F(2,44)=2.26$, $MSE=1.54$, $p=2.26$, $\eta^2=.093$, showing that the change in pleasantness were restricted only to the words that participants were able to learn (see Table 5).

Experimental conditions	Moment 1	Moment 2	Moment 3
Conc_Neg	4.54 (0.94)	4.16(1.08)	4.41 (1.27)
Conc_Neu	4.56 (1.14)	4.53 (1.29)	4.57 (1.39)
Abst_Neg	4.89 (1.01)	4.35 (1.03)	4.34 (1.24)
Abst_Neu	4.62 (0.86)	4.76 (1.11)	4.55 (1.06)

Conc_Neg (concrete negative), **Conc_Neu**(concrete neutral), **Abst_Neg** (abstract negative), **Abst_Neu** (abstract neutral)

Regarding the pleasantness of words that were actually learnt, there was a main effect of emotional content, $F(1,22)=49.30$, $MSE=76.52$, $p<.001$, $\eta^2=.69$, which reveals that the pleasantness of words was different when comparing negative and neutral words, being the former considered less pleasant ($M=4.15$; $SD=.18$) than the latter ($M=5.2$; $SD=.14$). Crucially, there was also a significant interaction of moment and emotional content, $F(2,44)=31.41$, $MSE=42.62$, $p<.001$, $\eta^2=.59$, showing that the difference in pleasantness between negative and neutral words varied along the different moments of the experiment (see Table 6). Although in Moment 1 there was no difference between negative ($M=4.9$, $SD=.16$) and neutral words ($M=4.56$, $SD=.18$, $p=.113$), negative words were considered less pleasant than neutral words in moments 2 and 3, being this difference higher in Moment 2, (negative words: $M=3.37$ $SD=.28$; neutral words: $M=5.72$; $SD=.21$; $p<.001$) than in Moment 3 (negative words: $M=4.15$, $SD=.27$; neutral words: $M=5.33$, $SD=.21$; $p=.001$).

Experimental conditions	Moment 1	Moment 2	Moment 3
Conc_Neg	4.98 (1.07)	3.50 (1.46)	4.13 (1.38)
Conc_Neu	4.59 (1.02)	5.75 (1.17)	5.09 (1.13)
Abst_Neg	4.87 (0.79)	3.23 (1.51)	4.17 (1.49)
Abst_Neu	4.52 (1.18)	5.68 (1.16)	5.57 (1.21)

Conc_Neg (concrete negative), **Conc_Neu**(concrete neutral), **Abst_Neg** (abstract negative), **Abst_Neu** (abstract neutral)

Free Recall Task

A repeated measure ANOVA with 2 (sessions) x 2 (concreteness) x 2 (emotional content) factors was conducted on the number of correctly recalled pseudowords (see Table 7). The results showed an effect of concreteness, $F(1,23)=5.81$, $MSE=14.08$, $p=.024$, $\eta^2=.20$, demonstrating that overall concrete words ($M=1.70$, $SD=.25$) were better remembered than abstract words ($M=1.15$, $SD=0.14$). There was no effect of emotional content whatsoever.

Experimental conditions	Session 1	Session 2
Conc_Neg	1.50 (1.47)	1.58 (1.28)
Conc_Neu	1.83 (1.49)	1.87 (2.11)
Abst_Neg	1.04 (0.90)	1.33 (1.16)
Abst_Neu	0.95 (1.04)	1.29 (1.19)

Conc_Neg (concrete negative), **Conc_Neu**(concrete neutral), **Abst_Neg** (abstract negative), **Abst_Neu** (abstract neutral)

To get more information from this task, we also analyzed performance in the free recall task only considering those pseudowords whose meaning was known by the participants. Thus, we calculated the proportion of recalled pseudowords with respect to the correctly produced words in the Translation Production task (see Table 8). We conducted separate 2 (concreteness) x 2 (emotional content) repeated measures ANOVAs of the first and the second Free Recall tasks. The analyses showed no significant effects of either concreteness or emotional content in any of the two sessions. However, it can be seen that in the first Free Recall task, there was a tendency for concrete words to be better remembered than abstract words, $F(1,22)=3.89$, $MSE=742.49$, $p=.06$, $\eta^2=.15$, ($M=18.39$, $SD=2.82$; $M=12.71$, $SD=1.82$ for concrete and abstract words, respectively). Regarding the second Free Recall task, there was a tendency of emotional (negative) words to be better recalled than neutral words, $F(1,18)=3.75$, $MSE=1416.09$, $p=.06$, $\eta^2=.17$, ($M=28.72$, $SD=3.78$; $M=20.09$, $SD=3.13$ for negative and neutral words respectively).

Experimental conditions	1st Free Recall task	2nd Free Recall task
Conc_Neg	15.76 (15.91)	32.58 (28.80)
Conc_Neu	21.01 (17.52)	24.83 (21.39)
Abst_Neg	14.82 (12.43)	24.87 (27.40)
Abst_Neu	10.59 (15.37)	15.35 (17.44)

Conc_Neg (concrete negative), **Conc_Neu**(concrete neutral), **Abst_Neg** (abstract negative), **Abst_Neu** (abstract neutral)

Translation Production Task

When analyzing the production of translations provided by the participants at the end of each session, the 2 (session) x 2 (concreteness) x 2 (emotional content) repeated measure ANOVA showed a main effect of each of the factors tested, $F(1,24)= 49.01$, $MSE=176.72$, $p<.001$, $\eta^2= .67$, for session; $F(1,24)= 16.81$, $MSE=64.98$ $p<.001$, $\eta^2= .41$, for concreteness; and, $F(1,24)= 18.84$, $MSE=56.18$, $p<.001$, $\eta^2= .44$, for emotional content (see Table 9). Regarding the sessions, as expected, words were better translated in the first session ($M= 6.04$; $SD=.58$) than in the second one ($M=4.16$; $SD=.55$), when a week had already passed. In accordance with previous results shown here, concrete words were better translated ($M=5.67$; $SD=.57$) than abstract words ($M=4.53$; $SD=.57$). Finally, regarding emotional content, neutral words ($M=5.63$; $SD=.58$) were better translated than negative ones ($M=4.57$; $SD=.54$).

Experimental conditions	Session 1	Session 2
Conc_Neg	6.20 (3.04)	4.08 (3.22)
Conc_Neu	7 (3.02)	5.40 (3.04)
Abst_Neg	4.96 (2.93)	3.04 (2.58)
Abst_Neu	6 (3.68)	4.12 (3.34)

Conc_Neg (concrete negative), **Conc_Neu**(concrete neutral), **Abst_Neg** (abstract negative), **Abst_Neu** (abstract neutral)

Effects of Anxiety: Correlations with the STAI scores

In order to investigate whether trait-anxiety modulated the acquisition of negative pseudowords, we analyzed the pattern of correlations between the answers to this questionnaire and the results obtained from the Free Recall and the Translation Production tasks by calculating Pearson correlations (see Table 10). No correlation was found whatsoever (all $ps > .23$).

Table 10: Pearson Correlations between the scores of the STAI questionnaire and the Free Recall Task and the Translation Production Task		
Experimental conditions	Correlation STAI score- Free Recall Task	Correlation STAI score- Translation Production Task
Session 1		
Conc_Neg	-0.02	-0.05
Conc_Neu	-0.04	-0.01
Abst_Neg	-0.17	0.17
Abst_Neu	-0.08	0.25
Session 2		
Conc_Neg	-0.15	0.02
Conc_Neu	-0.09	-0.09
Abst_Neg	-0.21	0.06
Abst_Neu	0.15	0.18
Conc_Neg (concrete negative), Conc_Neu (concrete neutral), Abst_Neg (abstract negative), Abst_Neu (abstract neutral)		

Translation Recognition Task

For the Translation Recognition Task, separate repeated measures ANOVAs were conducted with correct (“Yes” responses) and incorrect (“No” responses) translations. They were done for RT and %E.

Correct Translations

We conducted separate ANOVAs by participants and by items on RTs and %E. The analyses of correct translations included the factors concreteness, emotional content and session. All of these were within-participant factors in the analysis by participants. In the analysis by items, session was a within-items factor, whereas concreteness and emotional content were both between-items factors (see Tables 11 and 12 for RTs and %E respectively).

There was a main effect on emotional content, that was significant in the analysis by participants but not in the analysis by items, $F_1(1,16)=16.31$, $MSE=94334.81$, $p < .001$, $\eta^2 = .50$; $F_2(1,44)=.422$, $MSE=7606.47$, $p=.51$, $\eta=.01$, which means that participants took longer to respond to negative words ($M=876.80$; $SD=48.91$) than to neutral words ($M=824.12$; $SD=51.03$).

Table 11: Mean Reaction Times of the correct translations (SD in parentheses).		
Experimental conditions	Session 1	Session 2
Conc_Neg	804.00 (220.28)	894.16 (218.42)
Conc_Neu	812.58 (251.55)	846.19 (237.94)
Abst_Neg	914.43 (285.93)	894.45 (220.29)
Abst_Neu	816.72 (271.99)	821.00 (207.72)
Conc_Neg (concrete negative), Conc_Neu (concrete neutral), Abst_Neg (abstract negative), Abst_Neu (abstract neutral)		

Concerning the %E, the analyses revealed main effects in the analysis by participants and by items of the factors session, $F_1(1,23)= 9.69$, $MSE=6903.60$, $p= .005$, $\eta^2= .29$; $F_2(1, 44)= 16.06$, $MSE=4044.30$, $p< .001$, $\eta^2= .27$; and concreteness, $F_1(1,23)=11.60$, $MSE=6990.22$, $p= .002$, $\eta^2=. 33$; $F_2(1,44)= 13.23$, $MSE=2951.49$, $p= .001$, $\eta^2= .23$. These results showed that participants had more errors during the second session ($M= 29.99$; $SD= 3.90$) than during the first session ($M =18.00$, $SD=3.11$) and that their performance was much better regarding concrete words ($M=17.96$; $SD=2.77$) than abstract ones ($M=30.03$; $SD=4$).

Table 12: Mean percentage of errors of the correct translations (SD in parenthesis).		
Experimental conditions	Session 1	Session 2
Conc_Neg	14.58 (23.72)	21.52 (22.77)
Conc_Neu	9.16 (14.42)	26.59 (29.01)
Abst_Neg	24.65 (28.70)	38.88 (35.15)
Abst_Neu	23.61 (27.43)	32.98 (31.51)
Conc_Neg (concrete negative), Conc_Neu (concrete neutral), Abst_Neg (abstract negative), Abst_Neu (abstract neutral)		

Incorrect Translations

When analyzing incorrect translations, the factors concreteness, emotional content, session and semantic relatedness were included. Separate ANOVAs by participants and by items were conducted on RTs and %E (see Tables 13 and 14 for RTs and %E respectively). In the analysis by participants, all factors (session, relatedness,

concreteness and emotional content) were within-subject factors, whereas in the analysis by item, session and relatedness were within-items factors, and the rest of the variables: concreteness and emotional content were between-items factors.

The analyses by participants and by items of RTs revealed an effect on relatedness, $F_1(1,17)=8.46$, $MSE=88321.63$, $p=.010$, $\eta^2=.33$; $F_2(1,43)=5.02$, $MSE=167182.67$, $p=.030$, $\eta^2=.10$, showing that semantically related words (associated) produced an interference, as participants took longer to respond to them ($M=847.77$; $SD=44.27$) than to unrelated or control words ($M=812.74$; $SD=38.41$). There was also an effect of emotional content, $F_1(1,17)=5.68$, $MSE=120792.84$, $p=.029$, $\eta^2=.25$; $F_2(1,43)=13.59$, $MSE=281145.35$, $p=.001$, $\eta^2=.24$, showing that participants responded faster to neutral words ($M=809.78$; $SD=38.47$) than to negative words ($M=850.74$; $SD=45.06$). The analysis also revealed an interaction between session x relatedness x concreteness, $F_1(1,17)=6.37$, $MSE=68806.83$, $p=.022$, $\eta^2=.27$; $F_2(1,43)=5.34$, $MSE=46359.25$, $p=.026$, $\eta^2=.11$. In order to better understand this interaction, we calculated the magnitude of the interference by subtracting reaction times in control conditions from reaction times in associates. This analysis showed that in both sessions, the interference produced by the associates was only significant for concrete words. ($p=.026$ for session 1 and $p=.014$ for session 2). However, in Session 1, there was a tendency for associated words to interfere also in the abstract conditions, which it would mean that abstract words showed a similar performance as concrete words; this tendency was not significant, though, $p=.065$. In contrast, in Session 2, there was not any tendency for associate abstract words to produce an interference ($p=.130$).

Experimental conditions	Session 1		Session 2	
	Associates	Controls	Associates	Controls
Conc_Neg	907.60 (269.19)	864.17 (217.94)	897.91 (250.80)	794.36 (159.86)
Conc_Neu	851.36 (251.63)	789.12 (169.02)	810.46 (205.69)	762.07 (162.70)
Abst_Neg	871.76 (213.30)	842.56 (222.96)	791.05 (211.42)	836.47 (225.91)
Abst_Neu	894.53 (266.09)	811.91 (196.43)	757.47 (167.53)	801.28 (179.44)

Conc_Neg (concrete negative), **Conc_Neu**(concrete neutral), **Abst_Neg** (abstract negative), **Abst_Neu** (abstract neutral)

The analysis of errors by participants and by items showed an effect of session, $F_1(1,23)=5.47$, $MSE=3485.46$, $p=.028$, $\eta^2=.19$; $F_2(1,44)=11.97$, $MSE=1336.15$, $p=.001$, $\eta^2=.21$, showing that participants performed worse during the second session than during the first one (session 1: $M=9.58$; $SD=2.40$; session 2: $M=15.50$; $SD=1.70$). There was also an effect of emotional content, $F_1(1,23)=6.06$, $MSE=3566.67$, $p=.022$, $\eta^2=.21$; $F_2(1,44)=9.68$, $MSE=3509.77$, $p=.003$, $\eta^2=.18$, being participants more accurate with neutral words ($M=9.54$; $SD=1.84$) than with negative words ($M=15.64$; $SD=2.23$). A main effect was shown of relatedness $F_1(1,23)=5.47$, $MSE=17116.03$, $p<.001$, $\eta^2=.19$; $F_2(1,44)=26.55$, $MSE=9201.32$, $p<.001$, $\eta^2=.37$ which provides clear evidence that there was interference with semantically related words (associated words: $M=19.27$; $SD=2.51$; controls: $M=5.92$; $SD=1.23$).

Experimental conditions	Session 1		Session 2	
	Associates	Controls	Associates	Controls
Conc_Neg	22.77 (31.12)	4.44 (10.51)	37.64 (30.30)	5.14 (11.25)
Conc_Neu	5.83 (14.71)	2.70 (7.36)	7.63 (14.75)	3.75 (11.34)
Abst_Neg	12.01 (17.08)	6.73 (17.30)	29.52 (33.14)	6.87 (16.27)
Abst_Neu	15.90 (24.73)	6.25 (18.43)	22.85 (25.98)	11.45 (18.19)

Conc_Neg (concrete negative), **Conc_Neu**(concrete neutral), **Abst_Neg** (abstract negative), **Abst_Neu** (abstract neutral)

Some interactions also appeared in these analyses. The interaction of session x relatedness, $F_1(1,23)=9.649$, $MSE=1736.97$, $p=.005$, $\eta^2=.29$; $F_2(1,44)=5.54$, $MSE=739.07$, $p=.023$, $\eta^2=.11$, revealed that the interference produced by semantically related words (associated words) was higher in the second session than in the first session. Indeed, when we calculated the magnitude of the interference by subtracting the percentage of errors produced by control words to the percentage of errors produced by associated words in both sessions, we observed an increase in the magnitude of the interference between the first ($M=9.10$) and the second session ($M=17.61$).

The interaction between relatedness x emotional content reached also statistical significance, $F_1(1,23)= 7.89$, $MSE=3856.36$, $p=.010$, $\eta^2= .25$; $F_2(1,44)=10.22$, $MSE=3542.34$, $p=.003$, $\eta^2= .18$. This interaction revealed that the magnitude of the interference was much bigger with respect to negative words ($M=19.69$) than to neutral words ($M=7.01$).

Finally, the interaction between session x relatedness x emotional content was also significant, $F_1(1,23)=9.15$, $MSE=1264.03$, $p=.006$, $\eta^2= .28$; $F_2(1,44)= 4.88$, $MSE=651.58$, $p=.032$, $\eta^2= .10$. When calculating the magnitude of the interference, this analysis revealed that although the overall magnitude of the interference was higher for negative words than for neutral words, the difference between negative and neutral words was smaller in the first session ($M=11.80$ for the magnitude of the interference in negative words; $M=6.39$ for neutral words) than in the second session ($M=27.57$ for negative words; $M=7.64$ for neutral words).

DISCUSSION

The aim of this study was to investigate whether certain wordtypes were acquired and processed differently, more precisely, if the affective content of words produced any facilitatory effect in the first stages of foreign language acquisition and if that effect was modulated by words' concreteness. We also aimed to assess whether these newly acquired emotional pseudowords had the same emotional properties and whether they acted as emotional words in the native language or as emotional words in proficient bilinguals' second language. For that purpose, Pleasantness ratings and Free Recall tasks were conducted. We also investigated with a translation recognition task whether the new pseudowords had been successfully integrated in the participants' semantic. Furthermore, the role of individual differences in anxiety in the acquisition of emotional pseudowords was explored. Finally, we tested the stability of learning by evaluating the participants in two different sessions. The second session was conducted a week after the acquisition phase. The findings suggest that overall concrete words showed a better performance than abstract words in the different tasks. With respect to emotional content,

no facilitatory effect was found in the acquisition phase. However, the affective properties of these words seemed to have been acquired and to remain over time. Furthermore, the analyses of the Translation Recognition task showed that pseudowords have been semantically integrated, being the interference produced by associates bigger for emotional words. Lastly, no individual differences were found.

In order to examine if word type affected the acquisition of novel words, we analyzed the results provided by the correct translations of the Translation Recognition task and by the Translation Production task. With respect to the correct translations of the Translation Recognition task, RTs revealed that participants responded slower to negative words as compared to neutral words. The analysis of errors did not show any effect of emotional content. However, it showed an effect of concreteness, as participants performed better with concrete than with abstract words. The results from the Translation Production task showed a similar pattern: an advantage of concrete words over abstract words. No effect of emotional content was found in this task either. This would indicate that overall concrete words were much easier to acquire than abstract words regardless their affective content. Furthermore, the effect of concreteness was found in both sessions. As we have hypothesized, the acquisition phase was modulated by concreteness, being concrete words better acquired than abstract words.

Overall, these findings add more evidence to the concreteness effect found by many other researches (van Hell, & de Groot, 1998; de Groot, & Keijzer, 2000) and they could be explained in the light of different theoretical views such as the *Concreteness Effect Theory* by Paivio (1986) which states that concrete words are encoded in two different semantic systems, one verbally, and the other non-verbally; whereas abstract words are just encoded verbally. This difference in processing and the way words are organized in our brain would be the main cause of the advantage for concrete words. In addition, another explanatory theory that could serve to explain these results is the *Distributed Feature Model* proposed by de Groot (1992) regarding bilingual memory and processing, which it explains the representation of words at a conceptual level as a set of distributed features. The degree of overlap of the different meaning component of the new words and their equivalent translation may affect the acquisition of such novel words. Furthermore, if we

take into consideration not only the evidence provided in favor the concreteness effect, but also the evidence found in different studies of cognate status in acquisition of novel words (Tonzar, Lotto, & Job, 2009; Comesaña, et al., 2009; Comesaña et al., 2012), it can be concluded that wordtype can indeed affect acquisition of new words.

Regarding emotional content, we had predicted that in case there was a facilitatory effect of emotional content, then, emotional words should be better acquired than neutral words. We also hypothesized that this facilitatory effect of emotional content would be greater for abstract words than for concrete words. Contrarily to what it was expected, no main effect of this variable was found in any of the tasks. When analyzing the Translation Production task to investigate if emotional words were better acquired than neutral words, no effect of emotional content was found. This result is not consistent with the one reported by Ferré et al. (2015), who found that the emotional content of words facilitated the acquisition of novel words, being this facilitation only significant with abstract words. Our results are inconsistent also with the proposal of Kousta et al. (2011) who proposed that emotion would play a key role in the acquisition and processing of abstract concepts. He suggested that the differences in word processing of concrete and abstract words were due to the information these wordtypes carried, i.e., concrete words would rely more on sensorimotor information whereas abstract words would rely more on affective information. Following this line of reasoning, the emotional content of words would facilitate the acquisition and subsequent processing of abstract concepts.

In contrast, the present results are in line with those reported by Altarriba and Basnight-Brown (2012) who could not find any facilitatory effect of emotional content in the acquisition of novel words. They also conducted a Translation Recognition task and reported similar results to the one discussed above: higher RTs in the correct translation of emotional words as compared to neutral words suggesting that emotional words made participants performed worse than neutral words not producing the facilitation effect Kousta et al. (2011) would have predicted.

In order to find possible explanations for not having found any facilitatory effect of emotional content in the acquisition of novel pseudowords, we also aimed to investigate whether individual differences may affect the learning process of emotional words. It is

believed that people with higher anxiety-trait values tend to focus more on negativity. An example of this is the study carried out by Eden et al. (2014) in which participants with high and low anxiety-trait values were trained in a word-picture associated learning paradigm. A Translation production and Rating tasks were conducted afterwards. The results demonstrated that participants with higher values in anxiety showed a stronger memory bias towards negative words in the Translation production task and more negative ratings in the Rating task, suggesting that the level of anxiety of a person may affect the acquisition of negative words. Following that line of inquiry, our participants completed an anxiety questionnaire (STAI) at the end of the experiment and we analyzed the pattern of correlations between the trait anxiety scores and the results of the Free Recall and the Translation Production tasks. If the level of anxiety of the participants had influenced the acquisition of negative words, then, a significant correlation should have been observed. No correlation was found whatsoever, letting us discard the hypothesis that individual differences regarding anxiety may have influenced the acquisition of novel emotional pseudowords. A possible reason for the different results obtained in our study from those obtained in Eden's could be the procedure and materials used in each investigation. The acquisition phases were different. While in the present research, the pseudowords were paired with their equivalent translation; in Eden et al. (2014), the pseudowords were paired with pictures. Besides, these authors did not include abstract words and all the pseudowords were paired only with concrete negative and concrete neutral words. Probably, having presented pictures instead of words in the acquisition phase, and not having manipulated concreteness as well as emotional content affected the results obtained by these authors.

One of the other aims of the current study was to investigate whether newly learnt emotional pseudowords had the same affective properties as those that can be observed in words of the native language or in words of the second language of very proficient bilinguals, and if they behaved as such. To that purpose, participants conducted three different Pleasantness Rating tasks and two Free Recall tasks. The Pleasantness Rating tasks were developed before the acquisition phase, immediately after the acquisition phase and a week later. As we had hypothesized, there were different values from moment 1, 2 and 3. In moment 1, the values were almost the same for negative and

neutral words since participants were not acquainted with the meaning of the words yet. So, moment 1 served as baseline to compare the ratings of moments 2 and 3. In moment 2 and 3, there was a main effect of emotional content, with negative words having the lowest marks. Moreover, the difference in ratings of negative and neutral words was higher in Moment 2 than in Moment 3. An explanation for this reduction may be that the last Pleasantness Rating task was conducted a week later, when there had already been some loss of information. This would indicate, regarding the stability of learning, that from one week to another participants' performance levelled off. However, there was some information that still remained along the complete experiment, which in this case was the rating of negative words being considered as more negative than neutral words. In this point, our results are consistent with the ones obtained by Eden et al. (2014) in their analyses of the rating tasks. They found that after the acquisition phase in which the rating values of all pseudowords were very similar, the values of negative pseudowords changed becoming more negatively rated.

As a way to explore in more detail the results of the pleasantness task, we analyzed separately the pleasantness of pseudowords that participants had successfully acquired from the pseudowords that they could not learn (based on the words that participants produced in the translation production task). With respect to the pseudowords that had been learnt, the pattern was the same as the one above discussed: different ratings from moment 1, 2 and 3, having negative pseudowords the lowest marks with respect to neutral pseudowords only in moments 2 and 3, but not in moment 1. Nonetheless, there was no effect at all for the pseudowords that had not been acquired, meaning that the change in affective properties were restricted only to those pseudowords that have been successfully acquired.

The results from the Free Recall tasks (carried out after the acquisition phase and a week later) showed a similar pattern from the one obtained in the Translation production task: concrete words were better remembered than abstract words in both sessions regardless their emotional content. These findings are in agreement with the ones obtained in studies with monolinguals (Mestres-Missé et al., 2013; Palmer, MacGregor, & Havelka, 2013; Paivio, 1969). No emotional content effect was found, contrary to what was expected.

The analyses derived from these results is that although the affective properties of the pseudowords seemed to be acquired due to the results of the Pleasantness Rating tasks, these pseudowords would not have the property of being better remembered, which is common when emotional words in the first language are tested (Altarriba, & Bauer, 2004). In addition, when the Spanish words used for the four critical conditions were tested in a pilot experiment with native Spanish participants, a clear effect of emotional content was found. Taking into consideration what has been previously exposed, it can be reached to the conclusion that some wordtypes seemed to be present in the first stages of the acquisition of a foreign language such as concreteness (as its effect can be seen in the Translation production and in the Free Recall tasks), whereas some others such as emotional content seemed not to appear the initial stages but later.

A possible explanation for these findings would be, as Altarriba (2003) previously exposed, that emotional words in the second language are not as much experienced and heard as emotional words in the first language or in the second language of proficient bilinguals. As a consequence, this type of words would not be as deeply encoded in the second language. Evidence following this reasoning comes from the study of Altarriba and Basnight-Brown (2012) in which recently acquired emotional words when tested in an emotional Stroop task showed a different result from the one usually obtained in the same task with native words (Algom, Chajut, & Lev, 2004). In the native language, response times are slower for emotional words. Contrarily, when recently acquired, emotional words seem to produce faster response time than neutral words. Similarly, Anooshian and Hertel (1994) tested English-Spanish bilinguals in a rating task followed by an unexpected free recall task. They found that emotional words were better remembered in the participants' first language. When the stimuli were presented in the second language, there were no differences between emotional and neutral words. Contrary to these last results, Ferré, García, Fraga, Sánchez-Casas and Molero (2010) also tested bilinguals of Catalan and Spanish in a rating task followed by an unexpected free recall task. The main difference, as compared to the study of Anooshian and Hertel, was that these authors used highly proficient bilinguals, while in the previous study participants were not so proficient. The results of Ferré et al. (2010) showed that the recall for emotional words was of the same magnitude in their first and second language. These

findings would provide evidence that proficiency plays a key role in the processing of emotional words. Comparing these results to ours, we could conclude that as our participants were not proficient in the new language (actually, they did not know it), that could have been the reason why the emotional effect was not seen in the Free Recall tasks.

We also analyzed the Free Recall task only with those pseudowords that participants had correctly produced in the Translation Production task to investigate whether the facilitatory effect produced by emotional content was present in those pseudowords that participants could successfully acquire. The results did not show any statistical significant effect. However, it would seem that they were in line with what was expected, since there was a tendency for concrete words to be better remembered than abstract words in the first Free Recall task and a tendency for emotional words to be better remembered than neutral words in the second Free Recall task. The fact that the results had not reached significance may have been due to the small sample of participants tested. Future research should be conducted using a larger sample to corroborate whether this tendency reaches significance and to demonstrate if the tendency for emotional words to be better remembered than neutral words already exists in the first stages of acquisition.

Finally, in order to assess if the pseudowords had been integrated in the semantic system of the bilinguals we analyzed the RTs and percentage of errors of the incorrect translations in the Translation Recognition Task. The results showed that apparently the newly acquired pseudowords had been integrated in the participants' semantic system to some degree since there was a significant interference effect (i.e., the difference between semantically related words and control words) for all wordtypes. Altarriba and Basnight-Brown (2012) also found that the three wordtypes tested in their study (concrete, abstract and emotional) had been integrated semantically at some level, but this integration was not the same for the three types of words. Likewise, in the current study, the analysis of the interference produced by semantically related words was modulated by concreteness and emotional content, being concrete (when looking at RTs) and emotional words (when looking at the percentage of errors) the ones that produced the highest interference. The results with concrete words were expected because of the overall superiority for these

words in previous studies (van Hell & de Groot, 1998; de Groot & Keijzer, 2000) and in the present work. Nonetheless, the results with emotional words were unexpected due to the lack of facilitatory effects in the other tasks used in this study. The conclusion derived from these results would be that although emotional pseudowords were not better acquired than neutral pseudowords; those emotional pseudowords that had been successfully learnt were better integrated than the neutral pseudowords learnt.

Concerning the stability of learning, when analyzing the percentage of errors, associated words produced more errors than controls in both sessions, but the magnitude of the interference increased in the second session. The increase of the interference produced by the associates in the second session would indicate that the semantic integration of the new pseudowords has been consolidated from one session to the other. This is in agreement with several studies demonstrating that stronger effects appeared after a period of at least one day after learning, indicating that during this period, knowledge consolidates (Elgort, 2011; Davis, Betta, MacDonald & Gaskell, 2009).

Some considerations for future research

Some caveats should be taken into consideration for further research. The population used for this experiment, as stated before, was not so large as that used in other studies. A replicate of this study with more participants could provide more robust evidence of the role of emotional content in the acquisition of novel words.

On the other hand, regarding the emotional words included in the materials, they were all emotion laden words. Pavlenko (2008) distinguished three different types of emotion words: emotion words that directly refer to particular affective states like “happy” or “sad”; emotion related words that describe behaviors related to particular emotions like “tears” or “smile”; and emotion laden words that do not refer to emotions directly but that elicit emotions from people like “cancer” or “jail”. In future research, it would be interesting to distinguish between these three types of words to see whether the emotional content of a certain type facilitates more the acquisition of novel words.

Another interesting point to investigate in future work would be the study of wordtype in a phonetically different language, since in this study, the type of pseudowords used during

training only informed about the processing of words phonologically similar to the first language. Service and Craik (1993) showed that words difficult to pronounce are harder to learn. Thus, it would be interesting to explore the effects of concreteness and emotion when learning a language phonologically different from the L1.

CONCLUSION

In sum, all the findings exposed above provide clear evidence that some wordtypes are acquired better and faster than others. Concreteness clearly eases the acquisition of novel words whereas emotional content has not been proved to have a clear facilitatory effect. Having clear knowledge of which variables affect learning and to what extent they do so could help developing more effective training methods for teaching second languages. These methods should focus especially on enhancing word processing for those wordtypes that are not easily learnt.

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APPENDIX

Appendix I: Pseudowords

Acomnio	Inficor	Rutarmo
Badra	Ireror	Sanigo
Chuemo	Lautre	Saramo
Clacera	Lirime	Sasagno
Clogo	Llultame	Sovije
Decolte	Malgo	Suvega
Dergil	Mefialo	Tarcuza
Diloso	Noquina	Tavarta

Ficije	Nostor	Tavoio
Gaudra	Nuncero	Tevuezo
Gaura	Nurra	Tinguga
Gojal	Ocicha	Vaito
Gubra	Onrote	Valgel
Henfa	Ovarra	Zaripe
Huilona	Riciata	Zoyaco
Impinte	Rilio	Zuzco

Appendix II: Spanish words used in each critical condition

Concrete Negative

víctima látigo cementerio sangre ejército huracán secuestro tumor ataúd misil celda prisión

Concrete Neutral

torre despacho olla pensión bodega década provincia furgoneta capitán microscopio célula cable

Abstract Negative

dolor problema molestia adicción peste peligro traición obsesión crisis desorden venganza caos

Abstract Neutral

pieza trozo montón turno brevedad historia ejemplo rastro grado nivel género teoría

Appendix III: Meaning of the pseudowords in different files

Pseudoword	File 1	File 2	File 3	File 4
Acomnio	brevedad	víctima	microscopio	problema
Badra	secuestro	despacho	dolor	género
Chuomo	desorden	grado	ejército	década
Clacera	montón	misil	célula	caos
Clogo	prisión	furgoneta	obsesión	trozo
Decolte	género	secuestro	despacho	dolor
Dergil	ejército	década	molestia	grado
Diloso	historia	tumor	provincia	molestia
Ficije	caos	montón	misil	célula
Gaudra	cable	crisis	nivel	sangre
Gaura	pieza	ataúd	torre	traición
Gojal	crisis	nivel	sangre	cable
Gubra	problema	brevedad	víctima	microscopio
Henfa	peligro	ejemplo	cementerio	bodega
Huilona	década	desorden	grado	ejército
Impinte	nivel	sangre	cable	crisis
Inficor	misil	célula	caos	montón
Ireror	microscopio	problema	brevedad	víctima
Lautre	dolor	género	secuestro	despacho
Lirime	cementerio	bodega	peligro	teoría
Llultame	víctima	microscopio	problema	brevedad
Malgo	celda	pensión	desorden	rastro
Mefialo	huracán	capitán	venganza	turno
Noquina	peste	teoría	látigo	olla

Nostor	grado	ejército	década	desorden
Nuncero	obsesión	trozo	prisión	furgoneta
Nurra	provincia	molestia	historia	tumor
Ocicha	tumor	provincia	adicción	historia
Onrote	teoría	látigo	olla	peste
Ovarra	rastro	celda	pensión	adicción
Riciata	torre	traición	pieza	ataúd
Rilio	despacho	dolor	género	secuestro
Rutarmo	sangre	cable	crisis	nivel
Sanigo	turno	huracán	capitán	venganza
Saramo	célula	caos	montón	misil
Sasagno	traición	pieza	ataúd	torre
Sovije	bodega	peligro	teoría	cementerio
Suvega	pensión	adicción	rastro	celda
Tarcuza	adicción	rastro	celda	pensión
Tavarta	látigo	olla	peste	ejemplo
Tavoio	olla	peste	ejemplo	látigo
Tevuezo	ejemplo	cementerio	bodega	peligro
Tinguga	ataúd	torre	traición	pieza
Vaito	trozo	prisión	furgoneta	obsesión
Valgel	furgoneta	obsesión	trozo	prisión
Zaripe	capitán	venganza	turno	huracán
Zoyaco	molestia	historia	tumor	provincia
Zuzco	venganza	turno	huracán	capitán

