UVIC FACULTAT D'EDUCACIÓ, TRADUCCIÓ I CIÈNCIES HUMANES

CREATING A CONCRETENESS EFFECT IN VOCABULARY LEARNING: USING DIXIT ILLUSTRATIONS FOR THE ACQUISITION OF ABSTRACT WORDS

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Student: Gerard Ribas Roca

Tutor: Sarah Khan

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Resum

Segons la teoria de la codificació dual de Paivio (1980), ens és més fàcil recordar paraules que poden ser associades a imatges que d'altres de més abstractes que no son tant presents al món físic, la qual cosa es coneix amb el terme *efecte de la concreció* (Altarriba, Bauer, 2004; de Groot, 1992; ter Doest, Semin, 2005). Tanmateix, altres estudis (Shen, 2010; Farley et al.,2012, 2014; Mahdi and Qadha, 2019) també han conclòs que recordem millor les paraules abstractes que hem après tot associant-les a imatges. En aquest estudi experimental s'investiga quin és l'efecte d'associar imatges a aquestes tipus de paraules durant el seu procés d'aprenentatge. Es van ensenyar 24 paraules abstractes a 42 adolescents catalans estudiants d'anglès com a llengua estrangera, però només es van presentar amb il·lustracions del joc de taula Dixit la meitat d'aquestes paraules. Els participants en l'estudi van fer un test previ en què havien de declarar quantes de les 24 paraules coneixien i, després de rebre la instrucció, van fer un test en què se'ls preguntava el significat de les 24 paraules dues vegades (immediatament després d'haver-los-les ensenyat, i al cap d'una setmana). Els resultats de l'estudi mostren que en tots dos tests els participants recordaven un percentatge més alt de paraules que s'havien associat a imatges, en comparació amb les que no s'hi havien associat. Tot i que aquestes diferències han resultat ser no significatives, els resultats de l'estudi apunten en la mateixa direcció que altres estudis previs semblants, ja que suggereixen que en aprendre paraules abstractes, associar-hi imatges ens ajuda a recordar-les.

Paraules clau: codificació dual, efecte de la concreció, ensenyar vocabulari abstracte, aprendre vocabulari abstracte, metodologia pictòrica.

Abstract

According to Paivio's dual-coding theory (1980) it is easier to learn words that are associated with rich visual imagery than abstract words, due to what is termed the *concreteness effect* (Altarriba and Bauer, 2004; de Groot, 1992; ter Doest, Semin, 2005). Besides, other studies (Shen, 2010; Farley et al.,2012, 2014; Mahdi and Qadha, 2019) concluded that abstract words are better recalled if they have been associated to pictures during the encoding process. The present experimental study examined the effects of associating pictures to abstract words: 24 abstract target words were taught to 42 ESL Catalan teenage students, showing half of them with selected illustrations from the boardgame Dixit and the other half without pictures. The participants in the study were asked to do a pre-test that assessed their previous knowledge of the 24 target words before receiving the instruction, and to do the same meaning recall tests twice,

immediately after receiving the instruction and one week later. The results indicated that participants recalled at a higher rate the words that had been associated to pictures on both post-tests. Although these differences cannot be considered significant, the findings of the study are in line with previous research, since they suggest that associating pictures to abstract words help learners recall these words at a higher rate.

Keywords: dual coding, concreteness effect, abstract vocabulary teaching, abstract vocabulary learning, pictorial method.

1. Introduction

I would like to start this paper by mentioning what motivated me to choose the topic of this TFM project.

I am a fan of board games and I have always thought that some of them could be used successfully as a didactic tool. From my point of view, an example of board game with a clear didactic potential is Dixit. Sometimes ideas of activities using the game occurred to me and I looked forward to putting them in practise in a classroom to check its effectiveness as a teaching resource. I searched on the net if somebody had already used Dixit in a classroom and I was surprised to see the large number of different suggestions one can find regarding how to use this game in the education field.

Besides, I have always been interested in psychology, particularly on knowing how our memory works and why we remember some things and forget others so easily. This, as will be explained more precisely below, has a strong relation to this TFM project.

Also, the project is focused on vocabulary learning because I believe that vocabulary is a key point for language learning. Good vocabulary knowledge is crucial for mastering other language skills such as the reading and listening comprehension as well as speaking and writing. Studies like the ones conducted by Staehr (2008), Milton (2013) and Miralpeix and Muñoz (2018) signalled the importance of vocabulary size for language proficiency.

Staehr found a correlation between the amount of vocabulary learners know in a foreign language and their ability to handle questions on a text designed to test their ability to fully comprehend the text. Milton went further and claimed that the significance of the results of his study confirmed the importance of the vocabulary size dimension in all aspects of foreign language performance. According to this author, research shows “a moderate to strong relationship between vocabulary measures and the ability to read,

write, listen, and it seems also speak, in the foreign language" (Milton, 2013, p. 15). Miralpeix and Muñoz (2018) results revealed that there is a close link between vocabulary size and language proficiency, even in learners that know more than 5,000 words.

It is quite clear then that the more words learners know, the better they are likely to perform whatever the skill (Milton, 2013). We can communicate in a language without knowing the grammar of that language, but we need to know at least some words. In Wilkins' words (1972, p. 11), "without grammar, very little can be conveyed; without words, nothing can be conveyed".

We should also bear in mind that children tend to learn L1 words incidentally because they receive a massive oral and written input, but when a second (or third, or fourth, etc.) language is learned in formal contexts, incidental learning doesn't occur so often because the amount of input available is usually much more reduced since the time of exposure to the languages is shorter too.

Although vocabulary is an important element of any language in the context of communication, it is given least importance in the teaching-learning process since traditional linguistic theories suggested that grammar was the most important factor for achieving fluency (Siok and Muncie, 2006).

As a future teacher, I wonder how to provide English as second language (ESL) students better tools for integrating the learnt vocabulary and retention-based vocabulary learning strategies. This is the reason why the main objective of this study is to check the effectiveness of a particular teaching methodology for vocabulary learning.

2. Grounds and previous research

Considering vocabulary can be presented in many ways (contextualized, isolated, aurally, written, in semantic sets, in thematic sets, etc.), teaching vocabulary should involve providing learners some help to acquire new vocabulary items. In that sense, a recurrent researcher's question is how words of a second language can be taught (assuming they should be) to be retained in our memory for a longer period.

McDaniel and Pressley (1987), Tavakoli and Gerami (2013), Mahdy and Gubeily (2018) and Risna Sari (2018) research concluded that the mnemonics techniques they used in their studies have been effective to help people learn and memorize better. A fundamental characteristic of mnemonics is that new items can be learned by associating

them with what the learners have already learned. Some examples of this kind of techniques are making visual associations of the word with the context where it appeared or the letters that spell that word; associating the word to the situation in which it came up; creating mental imagery of the word to be learned; or creating a linkage between the word and a physical sensation, feeling or emotion. Although there are verbal and visual mnemonic techniques, in this TFM project I will focus on the latter.

Barcroft (2009) looked at the strategies most frequently used by student's intentional vocabulary learning and how they relate with performance. English-speaking participants were exposed to new Spanish words and pictures and completed questionnaires about the strategy they used to remember the words. The results showed that learners used twelve different types of strategies, and that second language word-picture association was the most frequent and was significantly better than second language translation and repetition. A possible explanation to these findings is that items being learned as pictures provoke different patterns of brain activation (visual processing areas) during recollection than do words (Fliessbach et. al. 2006).

Images play a vital role in the process of vocabulary learning and retention. Paivio (1971, cited in Mahdi and Gubeily, 2018, p. 117) already suggested that "words that can be presented by images may be coded dually (in both verbal and visual memory), so remembering them can be doubled". This theory is known as the dual coding theory and is based in the belief that visual and verbal information are stored in different parts of our brain, so if we have images and their associated words stored each in its correspondent parts, it is more probable that after reading or listening to a word we recall a mental image and, by association, we can remember the meaning of the word in the second (or other) language too. For this reason, second language vocabulary learning activities usually include images of the new words that are to be learned: because, apart from the word-word association, our brain can associate the image to the new word learned and recall its meaning.

If we look at the issue from a more biological point of view, what scientists know quite certainly is that the left hemisphere of our brains is responsible for most language function and the right one for most spatial reasoning and visuospatial processing (Cuevas, 2016). According to this author dual coding theory predicts that:

> there are two parallel pathways for retaining information (one for language on the left side and another for visuo-spatial information predominantly processed on the right side) and if the visuospatial centres on the right are activated during the process, then the combined computational power of bringing both hemispheres into use will increase our ability to retain information (p. 24).

Turning into didactic and pedagogical research, I observed that many studies of this kind confirmed it is harder for learners to learn and recall abstract lexical items compared to concrete ones: Altarriba and Bauer, 2004; Boers et al., 2007; de Groot, 1992; de Groot et al., 1994; Duthie et al., 2008; Schwanenflugel et al. 1992 (cited in Farley et al., 2014), and also Ellis and Beaton 1993; de Groot and Keijzer, 2000 (cited in Hamoud and Saleh, 2019).

Dual coding theory could provide an explanation to that, since it predicts that concrete lexical items are recalled easier than the abstract ones because they are associated with concrete concepts. Concrete words, due to their rich visual imagery, can be encoded via both the verbal and imagery systems, while abstract words can only be encoded via a verbal system. This is known as the concreteness effect, and it is a reasonable interpretation of the issue that was based on learners' self-reported strategies for encoding these two types of words (Hamoud and Saleh, 2019).

Some studies have supported the existence of the mentioned concreteness effect (Ter Doest, L. and Semin, G.R., 2005; Farley et al., 2014) and provided evidence of the positive effects of pictorial and visual stimuli in vocabulary learning since words associated with pictures having an increased rate of recall (Farley et al., 2014).

A picture superiority effect has been shown also in Liu (2004, cited in Farley et al. 2014), who studied if images could enhance reading comprehension. The results of the experiment revealed that low-level students receiving a high-level text with comic strips performed significantly better than their counterparts receiving the same high-level text only.

Besides, Boers et al. (2007, cited in Farley et al., 2014) discovered that etymological information of words helped learners comprehend and recall the meaning of idioms because such information appeared to have triggered mental images that made the concept of the idiom more concrete for learners.

In their study, Mahdi and Gubeily (2018) examined the effects of images as mnemonics on the acquisition of vocabulary (only concrete words). The results obtained from their experiment revealed that ESL learners in a group that was shown words with normal images, and another group who was shown bizarre images during their instruction (their experimental groups), both obtained significant better scores in two post-tests in comparison to the learners who were instructed only by showing the translations of the English words to Arabic (the control group). Another interesting result they identified is that learners in the group who was shown bizarre images together with the words obtained better scores than the group that saw normal images, which led them

to the conclusion that not all images are equally effective for improving the rate of recall of vocabulary (bizarre images are more effective).

Dual coding theory can be easily applied when teaching vocabulary items that are physical elements present in our reality, but not all vocabulary items can be represented so easily with images. When a student is learning, for instance, what a *ball* is called in English, the vocabulary teaching resource used can include an image of a ball to make more probable that in the future the learner associates the word *ball* with the picture he saw in the teaching resource and remembers the meaning of the word *ball*. However, what type of picture should the teaching resource include if, instead of *ball,* the vocabulary item to be learned is, for example, *democracy*? Can abstract concepts be represented with pictures too? If so, would these (mental) images help learners remember vocabulary for a longer time? Is there any way to use visual mnemonic techniques for teaching this kind of vocabulary, or this strategy is not valid for learning abstract words?

The studies made by Shen (2010), Farley et al. (2012, 2014), Mahdi and Qadha (2019) provide some clues to answer these questions, as they also examined the effects of pictures when learning abstract words.

Shen (2010) investigated whether pictures make a difference in how beginning Chinese learners acquire isolated lexical items. In her experiment Shen divided the participants into two groups and each one received a different instructional method: one group received only verbal encoding and the other one verbal plus imagery encoding (which involved pictures or acting out the meaning of words). The results showed that the verbal plus imagery encoding had a significant effect on learning the sound, shape and meaning of abstract words, but this effect was not observed for the concrete words.

Farley et al. (2012) investigated if attaching meaningful and rich visual images to abstract lexical items through metaphorical, emotive, and symbolic imagery would significantly affect their recall. A group of participants was taught new vocabulary (including concrete and abstract words) through a picture instructional method and the other group was taught the same vocabulary only through translations. The participants in the picture group recalled significantly better the abstract words in comparison to the other group, but the association of concrete words with images did not significantly increase their recall.

In their conclusions, both studies attributed the different effect of images for memorizing concrete and abstract words to the fact that the participants of the experiment had already mental images associated to the concrete words, so adding

other images in the instruction received had less influence in learning these words in comparison to the abstract ones, that had not been related to images before. Therefore, they not only proved that the concreteness effect predicted by dual coding theory can be generalized to abstract words as well, but also that the strategy of providing images for learning vocabulary is especially effective for learning abstract words because they are naturally impoverished in visual imagery in comparison to concrete words, that are naturally more visual, so associating concrete lexical items to pictures did not make a significant difference in the later.

A similar study was made in 2014 by Farley, Ramonda and Liu. They also did an experiment with a picture and a non-picture group according to the way they were taught some concrete and abstract vocabulary items. The participants of both groups were asked to do two tests after the instruction, an immediate and a delayed post-test. The group that received the picture training outperformed the non-picture treatment one regarding the rate of recall of abstract words on the immediate post-test, but the type of instruction did not have a significant effect on the recall of concrete words. Therefore, their results confirmed again that it is possible to create a concreteness effect for abstract words when they are associated with visual images; and that this strategy of associating visual images is even more effective when learning abstract words than concrete words. However, unlike the study made in 2012 (Farley et al., 2012), the results of this second study made two years later provided no evidence for a significant delayed effect of the instruction provided: the differences between the groups' performance in the delayed post-test were not significant.

The most recent study on the issue is Mahdi and Qadha's study (2019). In their own words, it "aims at investigating the effect of semiotics on learning abstract words" (p. 287). In short, the semiotic approach facilitates the English learning by providing the second language learners with verbal, non-verbal, and visual communication and provides an effective teaching/learning process through using body language, pictures, visuals, filmstrips, video, photography, etc. (Senel, 2007, cited in Mahdi and Qadha, 2019). One of the two experimental groups of their study was taught abstract words presented with images. The other experimental group was taught concrete words presented also with images. For the control group, concrete and abstract words were presented only with their correspondent translations to Arabic. Both groups using semiotics as a technique to aid learning vocabulary outperformed the students in the control group. The scores of the students in the concrete words group were slightly higher than the abstract words group, what indicates that semiotics can be more useful and effective in learning concrete words. However, it is fair to say that the results of the

study are in line with Shen (2010) and Farley et al. (2012, 2014) findings, because they also showed that using semiotic materials could be well utilized in teaching vocabulary, either abstract or concrete.

In contrast to most of the previously mentioned studies, Tavakoli and Gerami (2013) observed “no difference between pictorial and translation techniques in terms of their influences on vocabulary learning” (p. 313) after doing an experiment comparing the results obtained in a test by three different groups that had received different types of instruction: keyword method, pictorial method, and translations.

Despite dual coding theory being widely supported in research, as I have described, most teachers don’t usually plan their classes with the principles of dual coding in mind (Cuevas, 2016). I have already summarized some experimental studies that concluded that creating a concreteness effect is useful for learning abstract words, but I don’t know any example of teaching material that applies this thesis. This is consistent with what Cuevas comments in the following citation:

> too often questionable strategies such as the learning styles approach have come to dominate education without credible evidence for their use, while more well-supported models such as dual coding languish in the pages of research studies that teachers are never exposed to (2016, p. 9).

At this point I also feel necessary to remind that I found a study that suggests bizarre images are more effective for facilitating the meaning recall of words (Mahdi and Gubeily, 2018); and another one that concluded that attaching meaningful and rich visual images to abstract lexical items through metaphorical, emotive, and symbolic imagery would significantly affect their recall, at least in the short term (Farley et al. 2012). Therefore, because of its characteristics, I thought Dixit cards (evocative illustrations) could be a good resource for covering this lack of teaching resources applying the pictorial strategy methodology for teaching abstract words: Dixit includes a deck of illustrated cards and during the game players select cards that match a title suggested by a storyteller (all players act in turns as storyteller) and attempt to guess which card the storyteller selected. Hence, these illustrations, that can be described as dreamlike, evocative, strange, or sometimes even absurd images, are specifically designed to denote words to the people watching them.

Having in consideration all the information provided so far, I have set a main goal I aim to fulfil by executing this project: to explore if it is possible to create a concreteness effect for abstract words when they are associated with certain visual and evocative images (selected illustrations from the boardgame Dixit). In other words, to investigate if the presence of these evocative illustrations together with new abstract vocabulary items

to be learned causes any effect regarding its retention in the short- and long-term memory. Hence, my research questions are the following:

1. Will attaching visual imagery to abstract words increase the rate of recall of abstract words immediately after encoding (immediately after the words have been taught)?
2. Will the words presented with images be recalled at a higher rate after a week in comparison to the other words shown without images?

3. Methodology

In short, what I did in this project is a) a teaching experiment that consists in teaching abstract vocabulary items presenting half of them with images that aim to represent these concepts, and the other half without images, only showing their definitions and correspondent Catalan translations; and b) an analysis of the results obtained by the participants in two post-tests that assessed how many of the vocabulary items taught the participants were able to remember, focusing the examination on the potential differences between the rate of recall of words presented with and without images.

Before receiving the instruction, all participants were asked to complete a pre-test to check their previous knowledge of the words selected to be taught. After the instruction, they were asked to complete two times (immediately after receiving the instruction and one week later) another questionnaire that required them to write a proper translation for the words included in the teaching process, to check how many meanings of these words they still remembered.

Before going further, I want to detail some basic characteristics of this TFM project:

First is that it should be classified in the category of studies with an experimental approach. To be more precise, it is an experiment that implements the action-research method, as I was teaching ESL learners and experimenting with them at the same time.

Second is that the main research technique used to collect data were the questionnaires the participants of the study were asked to complete. Observing if there were big differences regarding the rate of recall of the vocabulary items presented with and without images in the results obtained by the participants in the post-tests is what allowed me to check if the Dixit illustrations were helpful to memorize and recall later the vocabulary items or not.

Also, considering that the discussion and results of the experiment refer basically to the numerical data extracted from the questionnaires and an objective analysis of it (comparing this data with the results obtained in previous research on the topic), this is clearly a quantitative study.

3.1 Participants of the study

All participants in the experiment were students at the secondary school where I was placed to do the practicum of this master's degree (Institut Rafael Campalans, Anglès, Spain). Two classes of 1st course of baccalaureate were selected and their members were asked to participate in the study, so all participants were approximately the same age. Most of them (if not all of them) have been studying English for about 10 years three hours a week.

The total number of participants in the study (n) was 42 in the pre-test, the instruction and the immediate post-test; and 40 participated in the delayed post-test.

In relation to the groups, it is also important to remark that the two groups (classes) selected weren't divided according to their language levels but according to their baccalaureate speciality and, consequently, their knowledge of English vocabulary was quite diverse.

3.2 Design of the study

As was already introduced, the experiment started by doing a pre-test to all the participants in the study that aimed to assess their existing knowledge of some potentially new English vocabulary items. To be more precise, 24 vocabulary items were included in the pre-test, and they were all abstract words that accomplish certain characteristics.

First, to ensure that the retrieval of the words in the post-tests was only affected by the experimental instruction and cannot be attributed to any kind of inferring process, I tried to exclude from the experiment abstract words whose meaning could be easily inferred because of their similarities in form and meaning to Catalan or Spanish words (words such as *comfort, horror, idea, justice, reality…*).

Second, to make it more probable that the words were unknown to all participants in the experiment, I made sure that none of the 24 words selected for the instruction are included in the first 1,000 most frequent English words according to The New General Service List (which is a list of 2,801 words specifically designed for ESL learners with high frequency words extracted from the Cambridge English Corpus). Therefore, the

participants in the study were not likely to have had many encounters with the words included in the study before.

The words finally selected for the study are the following ones: *appraisal, charity, dexterity, disbelief, dread, gallantry, gloom, gossip, grace, hesitation, inebriation, inhibition, mercy, oddity, pursuit, recklessness, relief, remorse, sloth, sorrow, stasis, tangle, wisdom,* and *worship.* All these words are also shown together with the pictures that represented them in the appendix section of the project (in the order they were presented to the participants in the experiment).

Here it is important to point out that the intention to do the experiment with words that are rarely used aims to attribute the recalling of the words in the post-tests to the impact of the instruction received and not to other factors. Nevertheless, if the pictorial methodology proved to be effective, there is no reason to think it would not be valid also for teaching more common vocabulary items.

The pre-test was developed by presenting 24 PowerPoint slides. Each slide included one of the words in English linked to an audio file where it was pronounced. The sound of the words was extracted from Macmillan and Oxford online dictionaries and in each audio file the words were said three times. The sound of the words was included in the pre-test to make sure that students heard the correct pronunciation of the words they didn't know from the very first encounter with them.

During the pre-test, students had to raise their hands every time they knew one of the words presented to them, and the total number of students knowing each of the words was noted.

After developing the pre-test, I started teaching the words to the participants in the experiment. The instruction received by them has some similarities to the one Farley et al. (2014) used in their study and which served us as a reference. However, there are two important differences between the instruction received by the students participating in this and their study.

The first difference is that in their instruction all words were shown all the time as isolated items (not being part of a text), whereas in the first phase of my instruction the words were shown together with a sample sentence, with the word in use. I thought that presenting the word also in a context would provide students a better understanding of the meaning of the words.

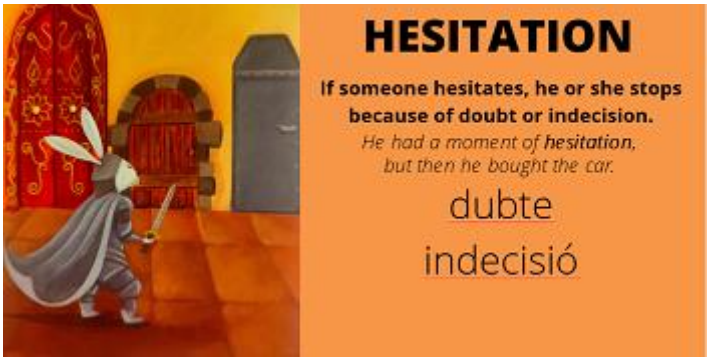
The second relevant difference is that I did not teach all words with images to a group and without images to the other group as they did. Instead, I taught half of the

words with images and half of them without images to both groups. The words taught with images to group A were taught without images to group B and vice-versa, so all words were shown with images to half of the participants in the experiment and without images to the other half. However, I was still able to examine the effect of the images by looking at the results obtained by the groups separately since I did not focus the analysis of the data on comparing groups (classes) A and B, but on checking out if the words shown with images to each of these groups had a greater rate of recall in the post-tests or not.

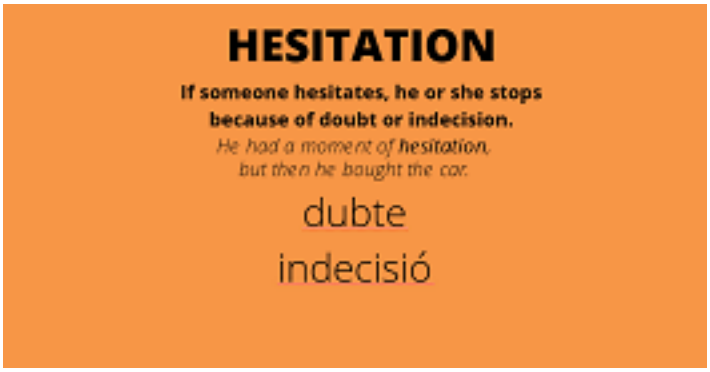
I divided the instruction in three phases. For every phase two PowerPoint presentations were prepared (one for each of the two groups) and all these presentations were shown to the students using a digital board. The first slide in all presentations included the instructions that let students know what they had to do in each phase before reproducing the rest of the presentation. Leaving apart these "instruction slides", that were equal for both groups, all presentations had the same structure (one word shown with its representative image followed by another one presented without any image) but different content depending on the phase of the instruction and the group the presentation was shown to.

In the first phase, when instructing group A, every odd slide, regarding its order of appearance (1,3…23), contained an abstract word in English together with a representative image of it (a selected Dixit card), a definition of that word, a sample sentence of the word in use, and one, two or three (depending on the word) Catalan translations of that word. Each even slide (2,4…24) included the word and the same information except for the image. When providing the instruction to group B the order of appearance of the words was the same as for group A, but in this case even slides included the images and odd slides did not. Pictures 1 and 2 show the difference on the slides shown to each of the two groups.

Picture 1 One of the slides shown to group A during phase 1.



PIcture 2 One of the slides shown to group B during phase 1.



The instructions provided to the students for the first phase stated: “read the information present in the slides and try to memorise the meaning of the words”. However, the main goal of this first phase of the instruction was to present the words and their meanings to the students, making sure everyone understood them. Students were allowed to ask any kind of doubt they had regarding the meaning of the words. Each of the slides was shown for twelve seconds.

In the second phase of the instruction, the same words already shown in the first phase appeared in the presentation’s slides, but this time each English word was shown together with three Catalan words. One of them was a proper translation of the English word, the other two were not. For this phase, the written instructions provided to the students in the first slide were:

1. Read the information present in the slides.

2. Think what is the proper Catalan translation for the English word (only one of the three words shown is correct).

3. Wait and check if the correct answer is the one you thought.

Again, in the presentation for group A each word in English and the three possible Catalan translations for it appeared in every slide accompanied with a Dixit illustration in the case of words present in odd slides, but only the word in English and the possible Catalan translations appeared in the even slides; and the opposite for the presentation shown to group B (even slides included images, odd slides did not).

For both groups’ instruction each of these slides were shown for six seconds and were followed by another slide that included only the English word and its equivalent word in Catalan. That way students could check if the translation they had mentally chosen was the correct one. Each of these “checking your guess” slides were also shown

for six seconds. This second phase reinforced the acquisition of the word meaning and, in addition, let students know what words they still needed to memorise.

The third phase was in fact a repetition of the first one, in the sense that the students only had to read the information of the slides and try to memorise the words and its meaning. However, at that point students were supposed to know already the meaning of the words, so the sample sentence was not included, minimizing the amount of information in the slides that could distract them. This phase was the last chance for the students to memorise the words and its meanings. Every slide was programmed to be shown for 5 seconds and the presentation was reproduced twice. Obviously, for each group the slides including images were the same as in the first and second phase of the instruction.

3.3 Data collection

Immediately after this instruction, that lasted around 30 minutes, a piece of paper with the first post-instruction questionnaire was distributed to each participant. The questionnaire contained a list with the 24 target words presented during the instruction, 12 of them had been shown with pictures and 12 without them to both groups.

Exactly one week after the first post-test, both groups were asked to do it again. The only difference between the first and the second post-test was that the words were randomized again so that they didn't appear in the same order, to diminish the potential impact of ordering. The realization of the delayed test was not mentioned to the students before the time to do it came, to avoid (or at least minimise the risk) that they reencountered the vocabulary items between the two tests: if I had told them that they would repeat the test the following week maybe some of the participants would have studied the vocabulary to perform better in the second test.

3.4 Data analysis

After the experiment, the results obtained by the two groups in the tests were examined and compared to see if there were differences between the rate of recall of words shown with and without pictures. For each correct translation the participants wrote in the tests, one point was given, but I separated the points into two categories, corresponding to the correct translations given for words that had been shown with pictures, on the one side, and for words that had been shown without pictures, on the other.

The same classification of the aggregate number of correct answers was done for the delayed post-test. Henceforth, I had four total scores: a) total number of correct

translations in the immediate post-test of words shown with pictures; b) total number of correct translations in the immediate post-test of words shown without pictures; c) total number of correct translations in the delayed post-test of words shown with pictures; and d) total number of correct translations in the delayed post-test of words shown without pictures.

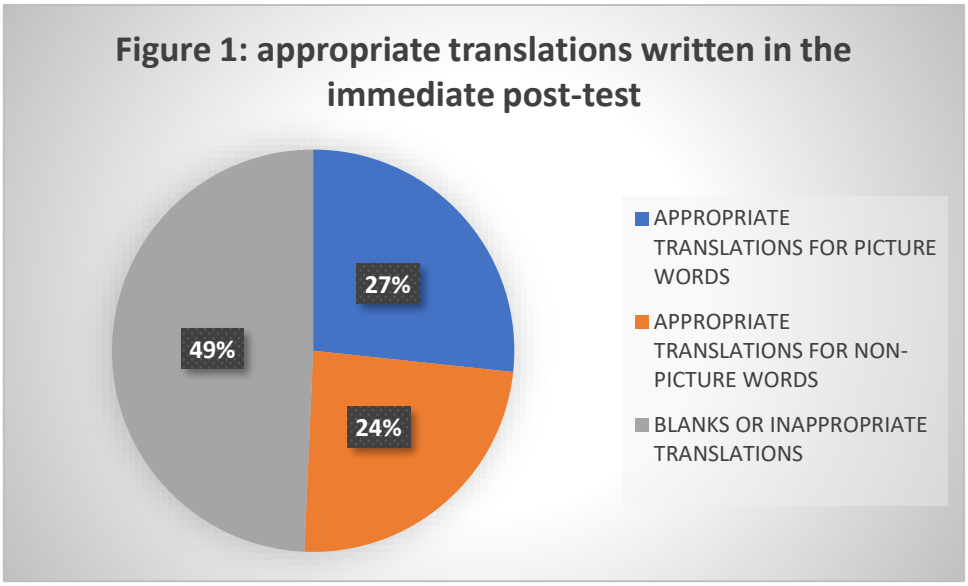
Since I wanted to analyse the effectiveness of the two applied methodologies (pictorial and non-pictorial), once I had these four total numbers of correct answers, I had to subtract from them the number of words the students claimed to know during the pre-test or, in other words, the ones they already knew before the instruction.

Once I had the total number of correct translations the students wrote in the two post-test divided into newly learned words shown with and without pictures, I did an statistic analysis (t-test) to determine if the differences found between the total number of words recalled in the two categories were significant.

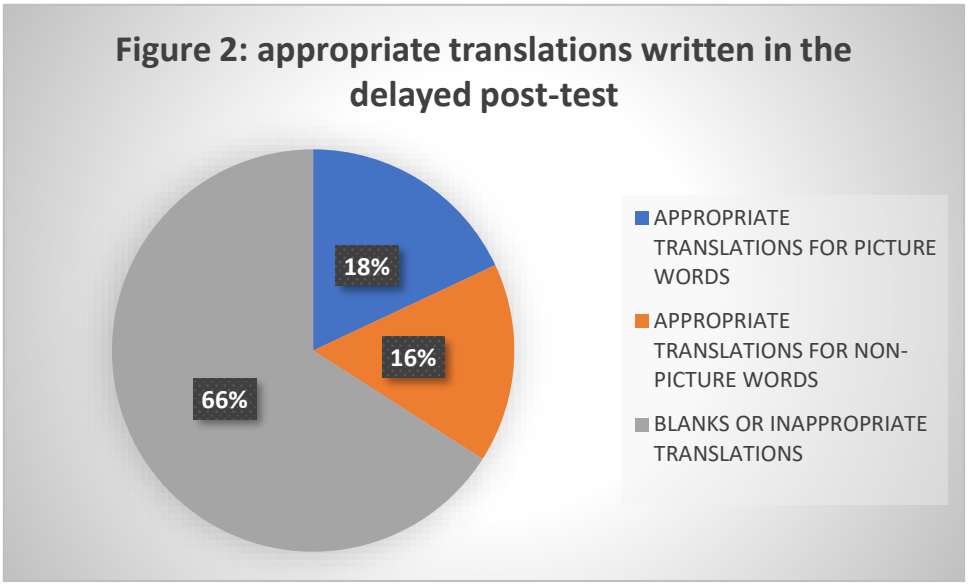
4. Results

In this section the results obtained after analysing the data collected with the tests are presented. There is also a brief explanation about what the results show, but the findings are described more in detail in the discussion section.

Figures 1 and 2 allow us to check if the instruction received by the participants in the study was effective or not for learning the target words. Figure 1 shows the percentage of correct translations provided by the students in the immediate post-test, that was taken by 42 students. The appropriate answers they provided (correct translations written in the immediate post-test) were divided in picture and non-picture categories because this is what I wanted to analyse to answer my first research question (will attaching visual imagery to abstract words increase the rate of recall of abstract words immediately after encoding?). Figure 2 shows the percentage of correct translations provided by the students in the delayed post-test, that was taken by 40 students. Their correct answers were also divided in picture and non-picture categories, to answer my second research question (will the words presented with images be recalled at a higher rate after a week in comparison to the other words shown without images?).



In the case of the immediate post-test, the participants in the study wrote 27% of correct translations for words that had been shown to them with pictures and a 24% for words that hadn't been shown with pictures. Nearly half of the words to be translated were not translated or the translations provided by the students were not correct.



Regarding the delayed post-test, two out of three of the words to be translated were not translated (66%) or the translation provided by the students was not correct. The participants in the study were able to write 18% correct translations for words that had been shown to them with pictures and a 16% for words that hadn't been shown with pictures.

Table 1 shows the aggregate number of words that members of group A and B all together claimed to know in the pre-test (first row), and the total number of words they were able to translate properly in the two post-tests (second and third row), separated in correct translations for words that were shown to them with images (second column) and without images (third column).

Table 1: Results obtained in the pre-test, immediate post-test and delayed post-test.

	PICTURE WORDS	NON-PICTURE WORDS
Pre-test	89	92
Immediate post-test	269	242
Delayed post-test	173	154

The whole group of students knew in advance a total of 181 words (89+92). In the immediate post-test they remembered 511 words (269 picture words + 242 non-picture words), and one week after they still remembered 327 (173 picture words + 154 non-picture words). The data I can extract from Table 1 which is worth considering is that students knew on average the meaning of 18% of the words in advance. I obtained this percentage dividing the total number of known words (181) by the 1,008 words shown to all participants (24 words shown to 42 participants).

In Figure 3 I present similar information as in Table 1, but in this case the words that students claimed to know before the instruction (the “pre-test” results exposed in Table 1) have been discounted from the other four totals in that table. That way we can

see the newly learned recalled words for each category (picture and non-picture words), what is absolutely necessary to answer my two research questions.

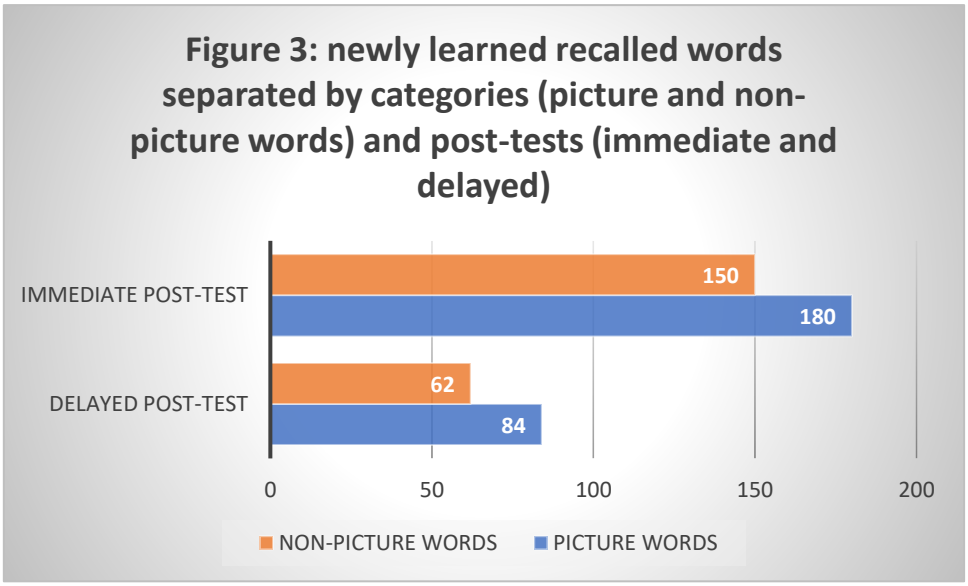
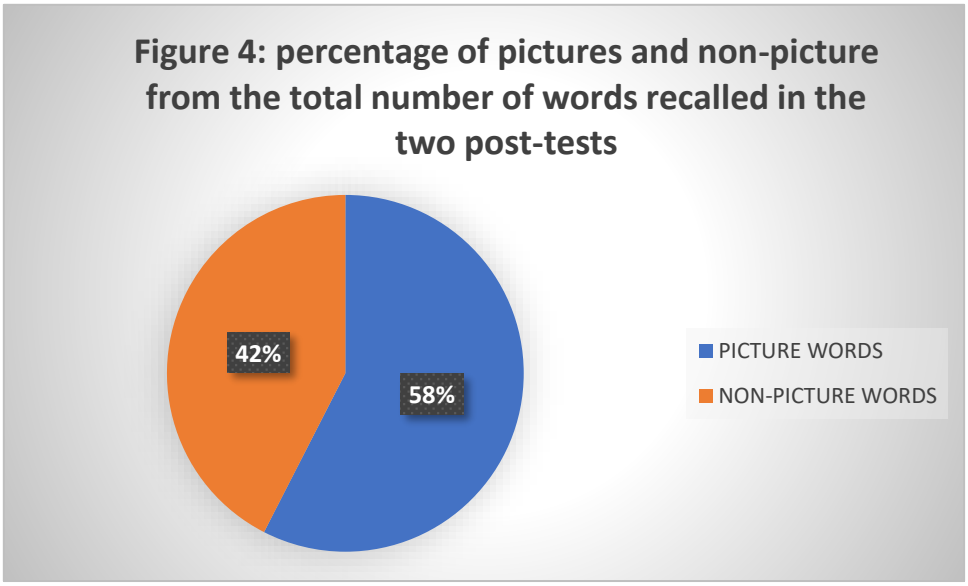


Figure 4 shows the differences between the rate of recall for pictures and for non-picture words in the two post-tests all together.



We can observe that from the total number of words recalled in the two post-tests all together are 58% of these words had been shown to the students with pictures and a 42% without pictures.

To see if the differences between picture and non-picture words were significant or not, a two-tailed t-test was developed. Table 2 shows the results of the t-test for the immediate post-test; Table 3 for the delayed post-test:

Table 2: t test for immediate post-test

	PICTURE WORDS RECALL IMMEDIATE POST-TEST	NON-PICTURE WORDS RECALL IMMEDIATE POST-TEST
Mean	**6,404**	**5,761**
Variance	**7,515**	**8,478**
Observations	**42**	**42**
Pooled variance	7,996	
Hypothesized mean difference	0	
Df	82	
t Stat	1,041	
P(T<=t) one-tail	0,150	
t Critical (one-tail)	1,663	
P(T<=t) two-tail	**0,300**	
T Critical two-tail	1,989	

Table 3: t test for delayed post-test

	PICTURE WORDS RECALL DELAYED POST-TEST	NON-PICTURE WORDS RECALL DELAYED POST-TEST
Mean	**4,325**	**3,85**
Variance	**7,917**	**6,541**
Observations	**40**	**40**
Pooled variance	7,229	
Hypothesized mean difference	0	
Df	78	
t Stat	0,790	
P(T<=t) one-tail	0,215	
t Critical (one-tail)	1,664	
P(T<=t) two-tail	**0,431**	
T Critical two-tail	1,990	

Examining the results of the t-test we can see that the students remembered on average 6.4 picture words on the immediate post-test and 5.7 words that had not been associated with pictures (out of 12). In the case of the delayed post-test, these data are

4.3 and 3.8 respectively. Therefore, the means are higher for picture words in both, the immediate and the delayed post-test.

Nevertheless, we can also see that the P values are 0.30 for the immediate post-test and 0.43 for the delayed one, what indicates that the differences observed between picture and non-picture words are not significant (we need P values lower than 0.05 to consider the differences significant).

All the data I presented in the previous figures and tables is analysed and interpreted more in depth in the discussion section that comes next.

5. Discussion

This study consisted in developing an experiment that had as its main objective to determine if abstract words accompanied with images (Dixit illustrations) would be recalled at a higher rate on an immediate and a delayed test that asked to translate them, in comparison to other words that were not presented to the participants with any visual support during the process of teaching all the 24 target words.

Although the experiment was carried out in two classes of first of baccalaureate, the results of these two groups were aggregated, joining their answers in the tests in two different categories:

a) correct translations given for words that had been shown to them with images

b) correct translations given for words that had been shown to them without images

I want to remember that I did not show the same images to all the participants in the study, but half of the words with and without pictures to both groups participating in the experiment. Therefore, when I extracted the data from the tests, I had to place the score of each proper translation (to picture or non-picture category) depending on the group the student was (class A or B). For example, when a student of the class A wrote *borratxera* (an equivalent Catalan word for *inebriation*) the score was attributed to the picture group, whereas if the student that wrote a good translation for the same word was in class B, the score was given to the non-picture group.

This has another important implication. That is, it doesn't matter if the students of the two classes had a very different general level of English, because the correct answers of both groups were put together and counted as a single total score. Consequently, regarding the previous knowledge of the words, in the pre-test the

members of one of the groups declared to know more words in advance than the other, but this didn't affect the results, since this number of previously known words was deducted from total scores of pictures and non-pictures categories. In other words, the results of the experiment are presented and analysed as if the experiment had been carried out in a single group.

Derived from the fact that the experiment was designed like I explained above, the instruction received was more similar for the two groups. I mean that if I had shown all words together with pictures to a group and without pictures to the other group, the pictures might have caused more motivation among the students placed in the picture group, or the students in that group would have paid more attention to the experiment, which could have altered the results.

In addition, word type is a constant variable too, in the sense that the same words were shown to both groups, adding pictures only to half of them.

After having made all these important remarks, I can start now analysing the results of the experiment (already reported in the previous section of the project).

First of all, in Figure 1 we can see that students could provide a proper translation for more than half of the words (if we add picture and non-picture words means, the number is higher than 12 of the total 24 target words) in the immediate post-test. If we take in consideration that, on average, they only knew 18% of all the words before the instruction, we can consider the methodology used for teaching the target words quite effective. I think it is reasonable to say it could be used (maybe with some adaptations) in non-experimental ESL lessons.

As could be expected, the number of correct translations provided in the delayed post-test was lower in comparison to the number of good translations the students were able to provide in the immediate post-test. This is totally logic since we tend to forget what we have learned over the course of time. Nevertheless, in this second post-test, done exactly one week after the instruction, the students were still able to provide a correct translation for one third of the words (20% more than their previous knowledge of the words).

However, our research questions were not so focused on investigating how effective the instruction provided was in general, but more in exploring if the words shown with pictures during the instruction had a greater rate of recall. Therefore, what is most important to answer the research questions is what we observe in Figures 3 and 4. We can clearly see there that in both, the immediate and the delayed post-test, the students recalled more words that had been shown with images to them, in comparison to the

ones they remembered that had been shown to them without images. More precisely, in the immediate post-test's results there was 26.68% correct translations for words that had been shown to the students with images and a 24,01% that had been shown to them without images. As mentioned before, in the delayed post-test the number of correct answers was lower, but the rate of recall was still two points higher for picture words (18.02%) than for non-pictures words (16.04%).

In parallel, in figure 4 we can observe that aggregating all the appropriate translations provided by the students in the two post-tests, the percentage from the total of words recalled that had been shown with pictures is 16% more than the ones shown without pictures: a 58% were translations for words that had been shown to the students with images and a 42% had been shown without images.

From the results of the t-test we can see that the means are higher for picture words in both, the immediate and the delayed post-test. The variance is quite high (in the range between 6,54 and 8,47), which means that some students provided correct translations for a lot of words and others for almost no words. If we leave apart the individual differences on memorising capacity, this high variance could also indicate that the instruction received was not equally effective to retain the words for all the students.

We need a 95% chance to affirm that the differences between the data corresponding to picture and non-picture categories are significant (P values lower than 0.05). Consequently, since the values of this study are higher than 0.05 (0.30 for the immediate and 0.43 for the delayed post-test), the differences found in the results of the post-tests between pictures and non-pictures words cannot be considered significant.

The results of this study are quite in line with others found in previous similar studies. Mahdy and Gubeily (2018), McDaniel and Pressley (1987), Risna Sari (2018), Tavakoli and Gerami (2013) research concluded that the pictorial mnemonic techniques they used in their studies have been effective to help people learn and memorize better, and I also found a greater rate of recall of words shown with pictures on our immediate and delayed post-tests. Other similar studies that got similar results to mine in terms of the positive effect of pictures for vocabulary learning are Liu's (2004, cited in Farley et al. 2014) and Boers et. al (2007, cited in Farley et al. 2014). Liu studied if images could enhance reading comprehension and the results of her experiment revealed that low-level students receiving a high-level text with comic strips performed significantly better than their counterparts receiving the same high-level text only. Boers et. al discovered that etymological information of words helped learners comprehend and recall the

meaning of idioms after such information has triggered mental images that made the concept of the idiom more concrete for learners.

However, all the aforementioned studies didn't examine the effect of pictures for memorising abstract words. On the contrary, Shen (2010), Farley et al. (2012, 2014) and Mahdi and Qadha (2019) included abstract words in their studies and proved that the concreteness effect predicted by dual coding theory can be generalized to this type of words too. In their studies, the strategy of providing images for learning vocabulary was especially effective for learning abstract words, and suggested as an explanation to this, that abstract words are naturally impoverished in visual imagery in comparison to concrete words (that are present in the physical world and naturally more visual) so associating concrete words to pictures did not make a significant difference in the latter. I didn't include concrete words in my study so I cannot compare if the effect of pictures is stronger for concrete or for abstract words, but the greater rate of recall I found in the picture words category is consistent with their theory.

Significant abstract word retrieval differences between only verbal encoding groups and verbal plus imagery encoding experimental groups were found in Shen (2010), Farley et. al (2012, 2014), and Mahdi and Qadha (2019). Although the differences I found are not significant, my results point in the same direction as theirs: showing abstract words together with pictures that represent them help learners memorise these words and retrieve them after some time.

The fact that the results of my study indicate that there are not significant differences between the rate of recall of picture and non-picture words could be attributed to the limitations of the current study, that are several.

First, the small number of participants (40/42) may threaten the validity of the study. A larger sample size would yield stronger evidence to generalize the findings.

Second, the participants in the study were approximately the same age. It would be interesting to replicate the study with other participants of different ages to compare if the pictures are equally effective for all ages or levels of English proficiency.

Third, for a reason of time limitation, the instruction lasted not more than 40 minutes and included only 24 target words. A longer instruction and a bigger number of words to be taught would also increase the reliability of the results.

Fourth, the conditions of the tests were not optimal: in the pre-test it was not checked that students raising their hands (declaring they knew the words presented to them) were telling the truth; in the post-tests, although it was clearly indicated that the

participants had to do the test alone, they had the chance to look at other's papers if they wanted (despite the fact that we were three teachers in the class and none of us observed this). These two uncontrolled elements could have impinged on the study results.

Fifth, all the images included in the instruction slides were illustrations taken from the boardgame Dixit, but it is fair to say that some abstract words were better represented by the selected images than others, and that not all images were equally impacting. Considering that only half of the images were shown to each group, this could also have had an incidence on the study results.

6. Conclusion

This study sought to examine the effects of pictures on vocabulary learning, and I centred my study in teaching only abstract words for two main reasons. Because the effect of teaching concrete words together with pictures that represent these words (or other self-created concreteness effect on the learners, such as teaching the strategy of creating mental images of the words to be learned) is already quite well described in the previous research, but not so many studies had been carried out analysing the effect of pictures when teaching abstract words. But also, because some of these studies that studied how pictures influence the acquisition and later recall of abstract words (Shen, 2010; Farley et. al., 2012, 2014; Mahdi and Qadha, 2019) showed that the pictorial method was even more effective for abstract than for concrete words, because the former type of words has less references in the real world and, therefore, it is more difficult that learners create a concreteness effect by themselves if these concrete items (in my case representative pictures of the words extracted from the board game Dixit) are not provided when the words are learned.

After teaching 24 abstract words (some with pictures and some without pictures) and analysing the data extracted from three tests (a pre-test to check the previous knowledge of the words the students had; a test done by 42 students immediately after the instruction; and the same test, in this case done by 40 students, one week after the immediate post-test), I can conclude that:

- The rate of recall of words that had been shown to the participants of the study with pictures during the instruction was slightly higher than the words they recalled that had not been taught with pictures to them in the immediate post-test.

- A higher rate of recall of words that had been shown to the participants of the study with pictures was also maintained one week after the instruction, in comparison to the number of words they remember that had not been taught together with pictures.
- The results of two t-tests that were done to check if the differences between the rate of recall of picture and non-picture words were significant indicated that they are neither significant for the immediate post-test, nor for the delayed post-test.

These three conclusions answer my research questions, that asked if attaching visual imagery to abstract words would increase the rate of recall of abstract words immediately after encoding (immediately after the words have been taught); and if the words presented with images would be recalled at a higher rate after a week in comparison to the other words shown without images.

The mentioned conclusions also support Paivio's (1971, 1986) dual coding theory, that assumes that verbal (texts and sounds) and nonverbal information (pictures and objects) are both coded dually in the human mind, so one system can be activated by the other and vice-versa.

In addition, they are in line with (Shen, 2010; Farley et. al., 2012, 2014; Mahdi and Qadha, 2019) studies' results, in the sense that they indicate that it is possible to create a concreteness effect for abstract words during encoding, to make them easier to remember and recall.

Besides, these conclusions can have pedagogical implications, in the sense that language teachers could use them for planning their vocabulary lessons, for example including visual supports when teaching isolated abstract words.

Finally, I couldn't prove that Dixit illustrations were better than other sources of images for representing the abstract concepts and words taught (to achieve this another comparative study using different resources could be developed). Nevertheless, I managed to find a Dixit card to represent quite well every target word during the instruction, so I haven't changed my original idea that this board game is a good resource to find images that can represent abstract concepts and, at the same time, be visually powerful (what, according to Mahdi and Gubeily (2018), increases the possibilities that learners store these pictures mentally in their minds during the encoding of the words, and consequently recall the words associated to them when needed).

As a closure, I just want to say that with this study I modestly hope to have contributed somehow to provide a piece of information to the enthralling research related

to vocabulary teaching and learning and, more precisely, to show how a concreteness effect can be created for teaching and learning abstract words so that they can be recalled in a higher rate.

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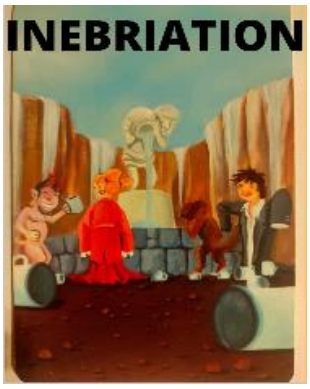
8. Appendix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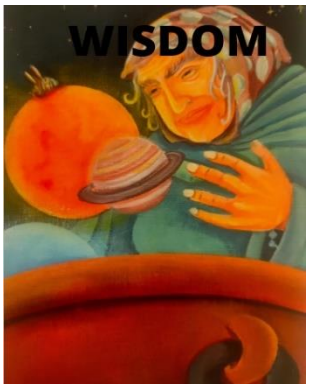
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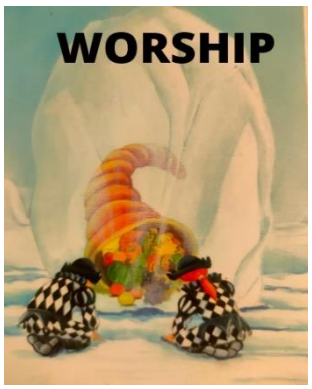
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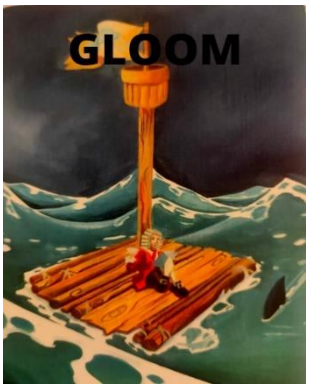
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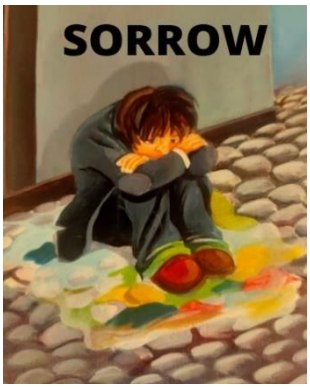
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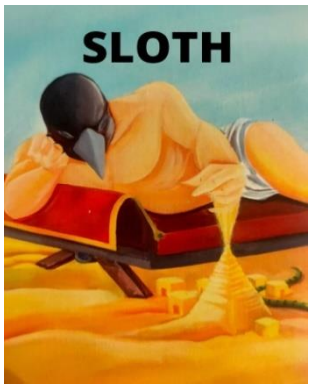
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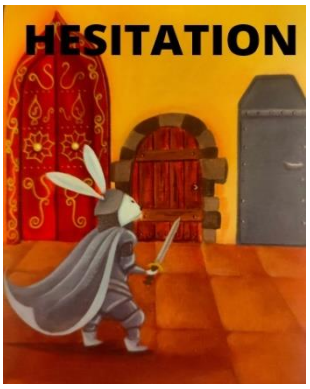
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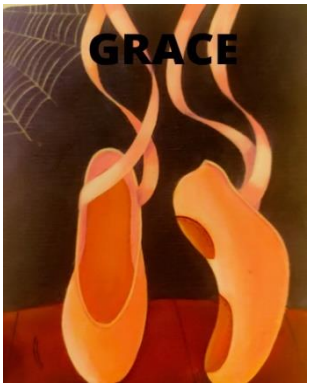
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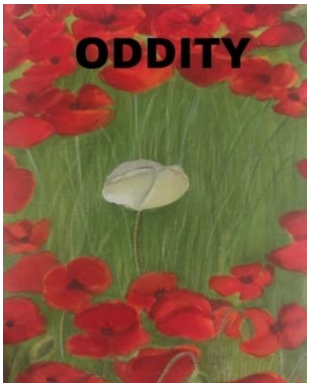
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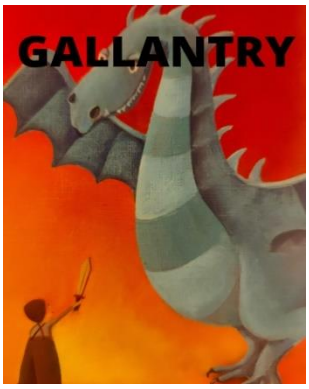
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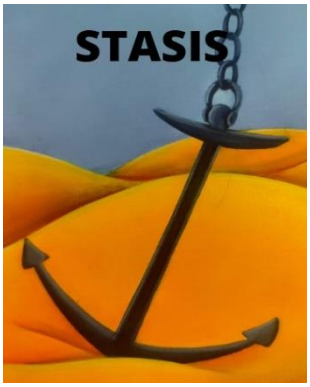
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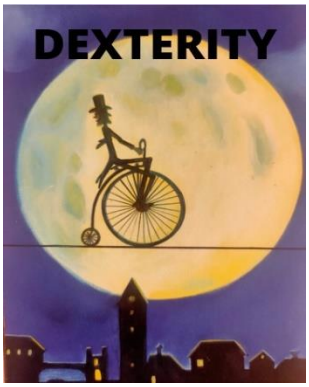
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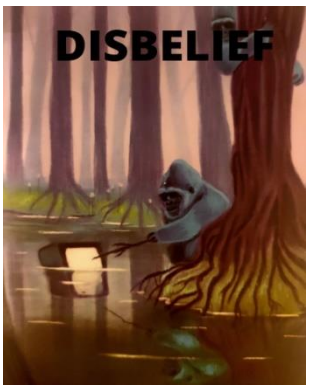
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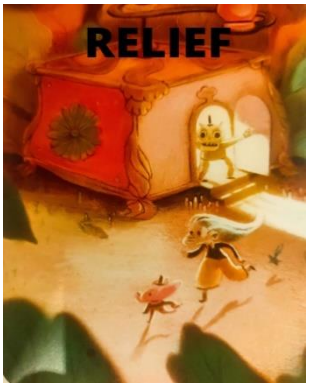
MERCY


GOSSIP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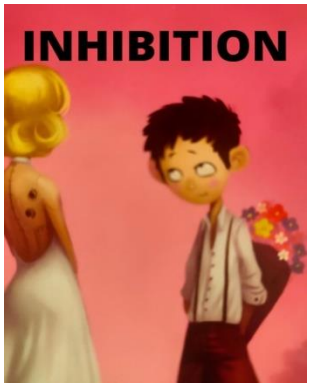
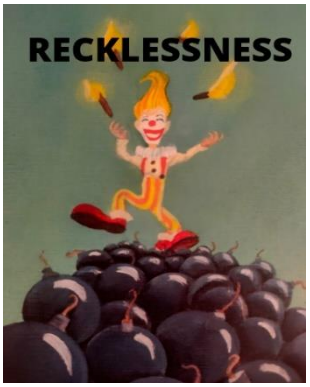

INHIBITION


RECKLESSNESS