

The Effect of Emotional Affect in L2 Lexical Learning

El efecto de la afectación emocional en el aprendizaje léxico de una lengua segunda

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RESUMEN

Estudios anteriores han revelado que las palabras con contenido emocional tienen un efecto facilitador para la memoria de los hablantes tanto de primera como de segunda lengua. Este estudio investiga cómo el cariz emocional de una historia, activado a través de señales audiovisuales, afecta la adquisición de elementos léxicos nuevos en hablantes de español como segunda lengua. Los resultados de una tarea de Asignación de Imagen y una de Nombramiento sugieren que los contextos emocionales positivos tienen un efecto facilitador para el reconocimiento y posterior evocación de los elementos meta en comparación con contextos emocionales neutros y negativos. Para la pedagogía de L2, estos resultados sugieren que la adquisición y retención léxica se puede mejorar a través de la incorporación de materiales didácticos con un componente emocional positivo.

Palabras clave: Adquisición de Segunda Lengua, Lingüística Aplicada, Emociones, Aprendizaje Léxico

ABSTRACT

Previous studies have found a facilitative memory effect for emotional content words in both L1 and L2 speakers. The present study investigates how emotional affect, activated through visual and auditory cues, effects L2 Spanish speakers' acquisition of novel lexical items. Data from Picture Matching and Naming tasks suggest that positive emotional context has a

facilitative effect on learners' recognition and recall of target items when compared to the emotionally neutral or negative contexts. The implication of these results in L2 pedagogy suggests that lexical acquisition and retention can be enhanced by the incorporation of course materials with a positive emotional drive.

Keywords: Second Language Acquisition, Applied Linguistics, Emotions, Lexical Learning

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1. INTRODUCTION

Over the past several decades, the relationship between affect and cognition, development, and general learning has received increasing attention (Mandler, 1989; Pekrun, 1992; Forgas, 2008; Fiedler & Beier, 2014). In the field of Second Language Acquisition, the role of affect has primarily focused on the effect of motivation and anxiety (Krashen, 1982; Gardner, 1985, 2007; Dewaele, 2002; Dörnyei, 1998, 2009; Ellis, 2015). In more recent years, there has been an additional focus on the acquisition and processing of the semantic content of emotional words by L1, L2 and simultaneous bilingual speakers (Anooshian & Hertel, 1994; Altarriba & Bauer, 2004; Dewaele, 2008; Pavlenko, 2008; Ayçiçeği(-Dinn) & (Caldwell-)Harris, 2004, 2009; Lindquist et al., 2015). However, little work has been done investigating the emotional context of the environment during language learning. To begin to fill this gap, the current study investigates lexical learning by a group of low-intermediate L1 English-L2 Spanish students in one of three emotional contexts: positive, negative, or neutral. Participants are then tested on their recognition and recall of the test words and the results from each emotional context are compared.

2. PREVIOUS STUDIES

2.1 Affect and Learning

Much of the research investigating affect and general learning ability has focused on feelings such as anxiety, stress, frustration, fluency, or achievement that arise as a result of students' internal reactions to a learning task. In general, research has found that there is no one-sided answer as to whether optimal learning occurs in positive or negative affective states. Joëls et al. (2006) suggest that stress can have both facilitating and impairing influences on learning and memory, asserting that stress will only facilitate learning and memory when it is experienced in the context and at the time of the event that needs to be remembered and when the hormones and transmitters released in response to stress exert their actions on the same circuits as those activated by the situation. In short, the stress must be directly associated with that which is to be learned.

Pekrun (2014) asserts that affective states, whether positive or negative, can have variable effects on learning. Positive and negative affective states can have the effect of drawing learners' attention away from their task performance and toward the emotion itself, thus reducing overall learning outcomes. Additionally, negative affective states, such as anxiety and shame can also reduce interest and intrinsic motivation as well as lower learners' ability to use flexible thought and action. However, these negative affective states can also have the opposite effect, inducing motivation to invest effort in order to avoid failure. Positive affective states, such as enjoyment or excitement, can facilitate learning when they are task-related; this is to say, if a learner feels enjoyment from engaging in the task itself, the task becomes the object of their emotion and their attention is drawn to it. This can also increase learners' interest and motivation, resulting in positive learning outcomes.

While much research has been conducted concerning affect as it relates to student feelings that result from the learning task (Fiedler & Beier, 2014), it is also important to take into consideration the emotional tone of the material itself and the way it is presented. The broaden-and-build theory (Fredrickson, 1998, 2001; Fredrickson & Branigan, 2005) suggests that positive emotions

broaden the scopes of attention, cognition, and action, resulting in a facilitatory effect on learning outcomes because learners pursue a wider range of thoughts and actions, such as playing, exploring, savoring, and integrating their experiences. Conversely, negative emotions shrink the array of percepts, thoughts, and actions.

2.2 Affect and SLA

In the realm of Second Language Acquisition, motivation has long been identified as an important factor for successful learning outcomes (Krashen, 1982; Gardner, 1985; Dörnyei, 1998) and there is a general consensus that motivation and positive affect are reliable predictors of high achievement among second language (L2) students (Gardner, 2007; Dörnyei, 2009; Ellis, 2015). Arnold (2009) argues that an "affectively positive environment puts the brain in the optimal state for learning: minimal stress and maximum engagement with the material to be learned" (p. 146). Conversely, stress and anxiety have been found to have detrimental effects on learners' concentration and their ability to encode linguistic stimuli; these negative affective states can hinder cognitive operations, memory processes, and they can interfere with language retrieval and production (MacIntyre & Gardner, 1994).

In more recent years, researchers have taken an interest in the relationship between emotions and language. Such research has served to put forward the notion that language plays a role in emotions as it supports that conceptual knowledge necessary to make meaning of sensations from the body and the world in a given context (Lindquist et al., 2015). Many bilingual speakers report experiencing stronger emotions when using their first language as compared to their second language (Pavlenko, 2005) and often prefer to use their second language to maintain emotional distance, finding it easier to express anxiety-arousing or taboo topics when operating in their non-native language (Altarriba & Santiago-Rivera, 1994; Harris, Ayiçiçegi & Gleason, 2003; Dewaele, 2004).

Pavlenko (2008) asserts that in the bilingual mental lexicon emotion words should be considered to be a separate class, represented and processed differently from both concrete and abstract word classes. Moreover, concepts of emotions can vary across languages, resulting in possible divergence between bilingual and monolingual speakers' emotional conceptions. Numerous

studies have found that emotion and emotion-laden words are better recalled than neutral words in various languages and among monolingual and bilingual speakers (Rubin & Friendly, 1986; Anooshian & Hertel, 1994; Altarriba & Bauer, 2004; Talmi & Moscovitch, 2004; Ayçiçeği & Harris, 2004; Ayçiçeği-Dinn & Caldwell-Harris, 2009).

Similarly, results from Anooshian and Hertel (1994) indicate that emotion and emotion-laden words are better recalled by bilingual Spanish-English speakers; however, this result was only present in their L1, regardless of whether that be Spanish or English. On the other hand, Ayçiçeği & Harris (2004) find superior memory for emotion words in recall and recognition tasks in both the L1 and L2 of bilingual speakers of Turkish and English; in fact, they identify that the overall memory effect was stronger in the speakers' L2, particularly with stimuli that have a negative connotation. Results from Ayçiçeği-Dinn & Caldwell-Harris (2009) indicate that words' emotional attributes are processed to a similar extent in both first and second languages; in both languages, taboo words have the highest rates of recall, followed by words with positive connotations. There was no recall advantage for negative words over neutral words in either the L1 or L2. Iacozza et al. (2017) investigate neutral and negative contexts in first and second language speakers. They find no difference between L1 and L2 in explicit ratings of emotionality; however, in nervous system reactionary responses, measured by pupil size, L2 speakers show less reaction to negative contexts than their L1 counterparts.

3. MOTIVATION

The goal of this study is to investigate how emotional bias affects lexical learning in L2 Spanish. The aim is to see if the emotion-memory effects attested in the literature extend beyond the semantic content of the words themselves. To that end, this study employs the use of nonce (i.e., invented) words, which serve two important functions: (1) the use of nonce words ensures that all participants have had the exact same exposure to the words that are to be tested, eliminating the possibility that some students may have previously learned these words in a different context; and (2) by using nonce words, it is possible to test the same story and lexical

items across all conditions under study. Potential implicit emotional biases are avoided as there are no associations with previous experience to be drawn from the target items and considering that the semantic content of the test words is null, the researchers are able to isolate emotional context from the semantic drive of the lexical items. The current study aims to investigate the following questions:

1. Does the presence of any emotional bias (whether positive or negative) facilitate lexical learning over the absence of emotional bias (emotionally neutral stimulus) in L2 Spanish speakers?
2. Are positive emotional stimuli better predictors of L2 Spanish learner success in comparison to negative emotional stimuli?
3. Is the effect of emotional bias of the stimuli the same for novel word recognition as compared to novel word recall?

With these questions in mind, the researchers have put forward the following hypotheses for the study:

Hypothesis 1: the presence of an emotional bias of any kind facilitates lexical acquisition in comparison to a neutral situation with no emotional tilt.

There is considerable research suggesting that positive affect is facilitative to second language learning (Gardner, 2007; Arnold, 2009; Dörnyei, 2009; Ellis, 2015). As such, our prediction is that the positive condition of our study will produce the greatest learning outcomes.

Hypothesis 2: for stories presented with an emotional tilt, positive emotional imagery and intonation will facilitate lexical learning among L2 Spanish learners when compared to negative affective conditions.

Considering the large body of research that has found that both positive and negative emotional semantic content facilitates recall and recognition (Rubin & Friendly, 1986; Anoshian & Hertel, 1994; Altarriba & Bauer, 2004; Talmi & Moscovitch, 2004; Ayiçegi & Harris, 2004), we predict that if we remove the semantic content of

the lexical items, but maintain the emotional drive, the emotion-memory effect will remain.

Hypothesis 3: the effect of the emotional bias in the story will be the same for recognition and recall of the novel words.

Following the results from Ayçiçeği & Harris (2004) for emotional content words, where there was a similar emotion-memory effect found for recall and recognition tasks, we predict to find similar effects for memory and emotional bias in our recognition and recall tasks.

4. METHODOLOGY

4.1 Participants

Twenty-seven non-native speakers of Spanish participated in the study. All participants were enrolled in a second-semester Spanish class at an American university. This study was conducted at the end of the semester; students were assessed through an informal interview with the experimenter and through classroom assessment by their instructor, and those who had achieved an ACTFL level of Intermediate Low in all language skills were included as part of the experimental data. After this selection criterion was applied, 23 participants remained. Participation in the study was voluntary, and all participants completed a Language Background Questionnaire referring to their experiences with Spanish and with other languages before completing the experimental tasks.

4.2 Procedure

The study consists of two separate tasks: a Picture Matching Task and a Picture Naming Task (Matching and Naming hereafter). Both tasks relate to a common story, presented below. The story contains 11 nonce words. It was created specifically to be as neutral in meaning as possible, so that three conditions could be created from it: a Positive condition, a Negative condition, and a Neutral condition. Participants were randomly assigned to one of the three conditions (positive condition: $n=8$; neutral condition: $n=7$; negative condition: $n=8$). Said conditions were implemented

through the use of specific emotionally charged intonation and through the use of emotion-triggering images (see Appendix). All conditions were presented to native speakers of Spanish for confirmation of the perceived emotional bias before conducting the study. Additionally, each participant was asked to judge the emotional undertone of the story after both tasks were completed.

Story:

Era un día muy **sojable**. Los pájaros piaban, y el mundo parecía estar **zorato**. Pepe, que vive en un **terulo** en el pueblo, se levantó muy **garente**. No sabía que ese día su vida iba a cambiar para siempre. Fue a su ventana al lado de la **jufena** y al mirar hacia fuera, vio el **plinico** a lo lejos. Así que salió y fue a ver a Sara, que trabajaba en la **turina**. Juntos decidieron empezar con su plan **colfante**. Primero, hicieron el **gasicho**. Cuando terminaron, se veía muy **mifesco**. Y desde entonces, el pueblo nunca será lo mismo. Será, para siempre, un lugar mucho más **rapristo**.

Translation:

*It was a very **sojable** day. The birds were chirping and the world seemed to be **zorato**. Pepe, who lived in a **terulo** in the town, woke up very **garente**. He didn't know that day his life would change forever. He went to the window next to the **jufena** and, looking outward, he saw the **plinico** in the distance. So he left and went to see Sara, who worked in the **turina**. Together they decided to start their **colfante** plan. First, they made the **gasicho**. When they finished, it looked really **mifesco**. And since then, the town would never be the same. It would forever be a much more **rapristo** place.*

As seen in the story, all nonce words were nouns or adjectives matched for syllable length and phonotactically Spanish. Each version of the story was pre-recorded in a PowerPoint presentation and presented auditorily. Each novel word was reinforced with a visual and textual presentation: it appeared written on the screen with an associated image. Both cues disappeared after 1 second.

Example 1 below shows three distinct versions of visual stimuli used for each Condition. In this case, the word *Mifesco* is

illustrated. For a complete list of the imagery associated with each nonce word, see Appendix.

(1) Visual stimuli associated with the nonce word *mifesco*.

Positive



Negative



Neutral



In the Matching task, participants initially saw a slide with all images from the story on it. One by one, the nonce words would appear on the screen for a second, and participants would point to the image associated with each word.

The Naming task started with all images on the screen as well. In this case, participants would be asked to use the nonce words they remembered to name as many of the images as they could. The experiment was organized as follows:

1. Participants watched the presentation/listened to the story twice.
2. Participants completed the Matching task.
3. Participants watched the presentation/listened to the story **without graphic presentation of the words** once.
4. Participants completed the Naming task.
5. Participants were asked to provide their perception of the story as positive, negative or neutral.

Participants provided strictly oral responses to each task. Responses to each task were recorded by the experimenter for further coding and analysis.

4.2.1. Rating Study

A rating study was conducted using an emotion wheel based on Feldman Barret & Russell (1998) to ensure the reliability of the stimuli as positive, neutral, or negative. Participants saw the images used as experimental stimuli and chose a minimum of one and a maximum of three adjectives used in the emotion wheel to describe

each image. The emotions displayed in the wheel varied in valence (horizontal axis) and arousal (vertical axis), as seen in Figure 1.

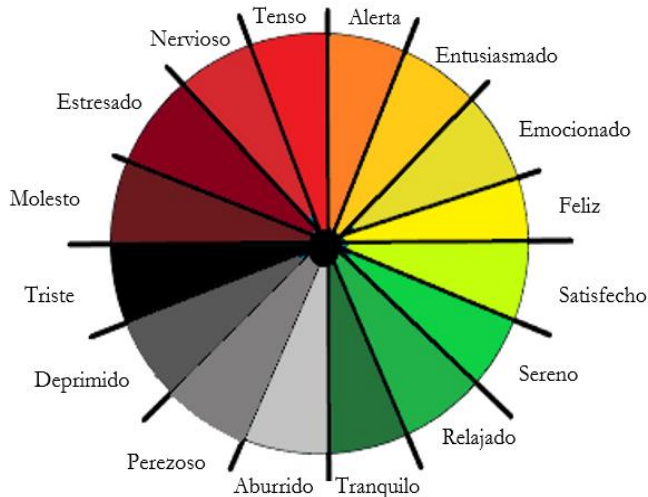


Figure 1. Emotion wheel

9 native speakers of Spanish participated in this study. The data were coded and analyzed based on whether participants' reaction to each image matched the experimenters' intended emotion in valence, arousal, or both. Results from this rating show participants are highly perceptive of the intended emotions shown by the images, as 95% of participant responses matched either the intended valence or arousal of the images. When breaking down both categories, participants seem more sensitive to arousal distinctions (74.25% match between the intended and perceived arousal) than to valence distinctions (68.6% match), but both sets of results are well above chance, as the difference between matching and non-matching responses is highly significant for both valence and arousal data (two-sample t-tests $p < 0.0001$). Figure 2 below summarizes the results obtained for this task.

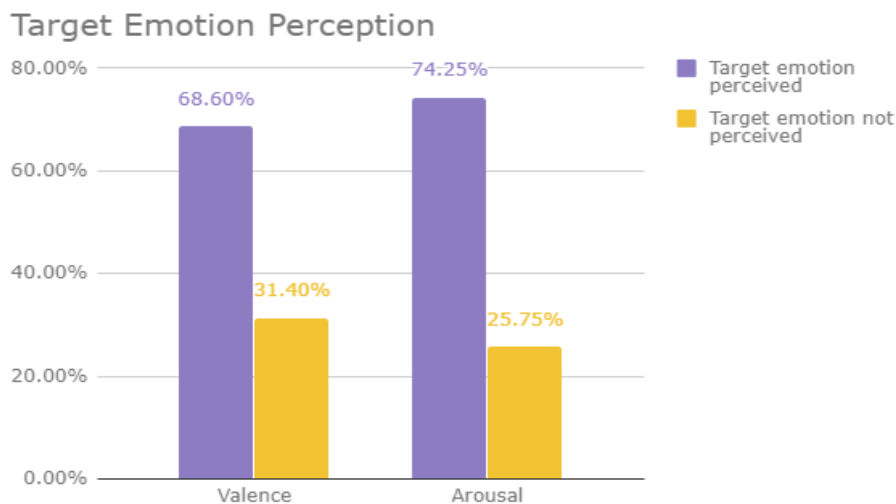


Figure 2. Rating Task Results

4.3 Coding

Coding for the Matching Task was described as either Target or Non-Target based on whether participants associated the correct image with each of the words that appeared individually on the screen. Since the Naming Task requires oral production, there is more variability in participants' responses. Table 1 shows an example of the existing coding categories for this part of the study.

Target	Partial Target	Off-Target	Not Attempted
Mifesco	Modesco	Different item: Rapristo	Participant said they did not remember

Table 1. Naming Task coding examples

Target and Partial Target responses are grouped together for analysis under the label "Target", and Off-Target and Not Attempted responses are categorized together as "Non-target". This decision was made on the basis of the cognitive demands of the task: the

authors recognize that the exact phonetic realization of each nonce word may not be perfect, but Partial Target responses show that participants have retained a general representation of the word (all Partial Target responses consist of at most two mis-remembered phonemes in the word).

5. RESULTS

5.1 Matching Task

Overall, participants performed at a high accuracy level in the Matching Task in all conditions, indicating that the task was appropriately gauged for their level of Spanish. All nouns are matched at a rate of 70% or higher in all conditions (specifically, 80% for positive and Neutral presentations and 71% for negative). However, there seems to be a slight disadvantage to the negative condition, as seen in Figure 3.

Matching Task

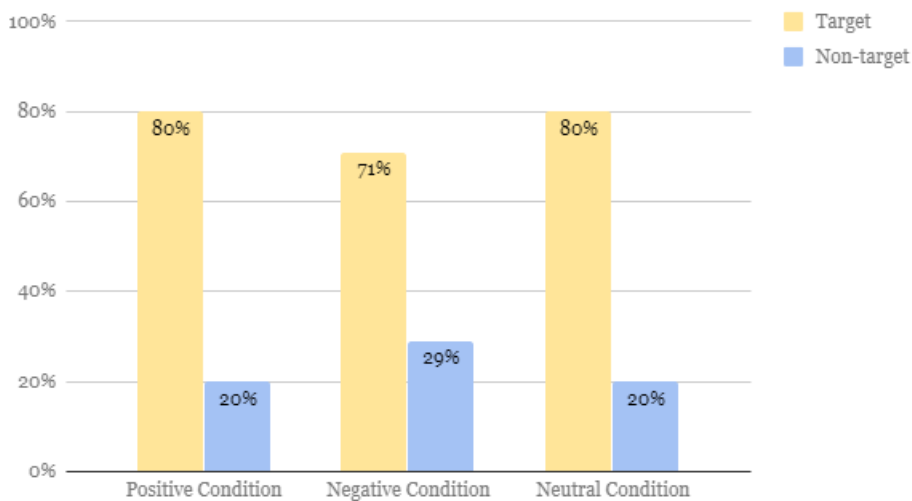


Figure 3. Matching task results

A one-way ANOVA revealed a statistically significant difference between conditions ($F(2,20)=19.684, p < .0001$). A Tukey post hoc test showed that the scores for target responses in the negative condition were significantly lower than in the Neutral

($p=.001$) and positive ($p=.001$). There was no statistically significant difference between the Neutral and positive conditions ($p>.05$).

5.2 Naming Task

The results of the Naming Task show an advantage for the positive Condition over the Neutral and Negative conditions. Accuracy in the positive Condition reaches 86% for this group of speakers, whereas the Negative and Neutral conditions are both below 75% (at 72% and 74%, respectively).

Naming Task

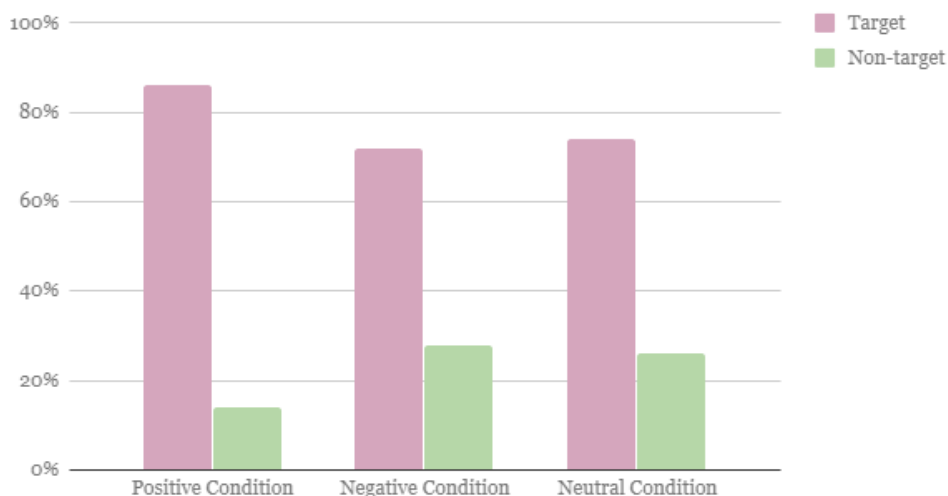


Figure 4. Naming task results

There was a statistically significant difference between conditions as determined by one-way ANOVA ($F(2,20) = 32.1718$, $p < .001$). A Tukey post hoc test revealed that the scores obtained for the positive condition were statistically significantly higher than those of the Neutral ($p < .001$) and Negative ($p < .001$) conditions. There was no statistically significant difference between the Neutral and Negative conditions ($p = .469$).

When intra-task comparisons are made, the positive condition shows an overall advantage over the remaining two. While participants' responses are most on target in the positive category,

there is a decline in accuracy in the Neutral one. “Negative” consistently displays the lowest scores in both tasks, with no improvement or decline for either exercise.

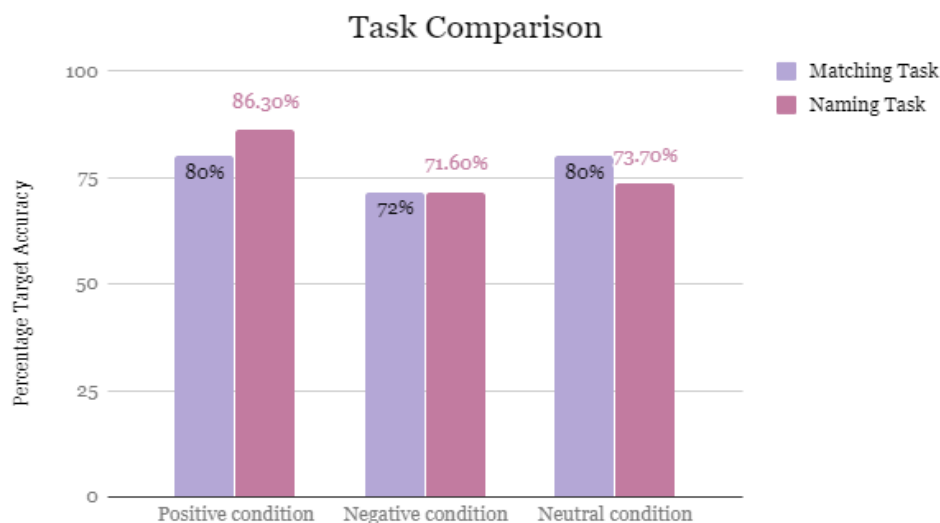


Figure 5. Matching and Naming task comparison results

6. DISCUSSION

The results of these experiments show a clear advantage of the positive condition in both tasks. Solely changing the emotional character of the images and intonation has a significant impact on L2 learners’ recall and recognition of novel words. These results suggest that lexical learning and retention are most facilitated when taught with materials that elicit a positive emotional affect. This finding aligns with previous studies that claim that high motivation and positive affect favor second language acquisition (Gardner, 2007; Arnold, 2009; Dörnyei, 2009; Ellis, 2015). Negative intonation and imagery, on the other hand, have a negative impact on the response patterns presented by this group of speakers. Participants overall attained high accuracy rates in the Matching task; however, even in this task it can be seen that the negative condition results in a cost to lexical recall. While speakers still show an above-chance matching capacity, the fact that the scores are significantly lower suggests that it is not the use of *any* emotion that

can facilitate lexical learning and retention, but specifically the use of positive, happiness-evoking tones and images. The data in this study, thus, broaden our understanding of affect in Second Language Acquisition, extending assertions that positive affect is associated with positive language-learning outcomes beyond *feelings* to the realm of *emotions*. Likewise, where previous research has stated that negative affect such as anxiety and stress have a negative impact on language learning outcomes (Krashen, 1982; MacIntyre & Gardner, 1994), this research has found that negative emotions in pedagogical materials can have a similar effect.

There are clear pedagogical implications for these results in the creation and implementation of classroom materials, particularly in methods to introduce new vocabulary in the language class. This research provides data-driven evidence of the importance of providing students with a positive environment that transpires not only from the professor's attitude, but also from the materials that they are exposed to, particularly in audiovisual resources where the emotional affect is provided for the student rather than student-generated, as it may be in a reading activity.

While accuracy rates for positive and negative conditions remain relatively constant between the two tasks, the Neutral condition presents a decline in accuracy from the Matching to the Naming task. This seems to suggest that while a neutral story is not detrimental to word association, it does not facilitate lexical encoding to the same extent as the positive condition. This could potentially be explained in reference to the Yerkes-Dodson Law (Yerkes & Dodson 1908, Cohen 2011), which states that over- or under- arousal reduces behavioral task performance. Therefore, it is plausible that the stimuli for the Neutral condition are not arousing enough for this set of participants. However, the Yerkes-Dodson Law falls short in explaining the task comparison: if the stimuli are under-arousing, this effect should be visible in both tasks. Further study is necessary at this point to specifically test the Yerkes-Dodson Law and its relationship to lexical learning in emotional conditions. In future studies it would be prudent to investigate further the impact of neutral affect on lexical retention rates, as this is a potential explanation for the results found in the current study. This result would be in line with the emotion-memory advantage granted by a word's semantic content found by Rubin & Friendly, 1986; Anooshian & Hertel, 1994; Altarriba & Bauer, 2004; Talmi &

Moscovitch, 2004; Ayıçiçeği & Harris, 2004; Ayıçiçeği-Dinn & Caldwell-Harris, 2009, as mentioned in Section 2.

The difference between the matching and naming tasks in the Neutral version of the story seems to suggest the presence of an interpretation/production asymmetry in the learning of nonce words when produced with a lack of emotional affect. Said asymmetry, studied by authors such as Conroy and Lidz (2007) or Pickering and Garrod (2013), has been explored in the field of L1 and L2 acquisition with somewhat conflicting results (although a general consensus seems to indicate that production tends to be more conservative than interpretation). However, to the authors' knowledge, this asymmetry has never been studied with regards to how emotions link to language acquisition. Although this was beyond the scope of the current article, future research should address how these two aspects of L2 acquisition (the comprehension/production asymmetry and emotions) interact.

7. CONCLUSIONS

The overall finding that new content presented with a positive emotional drive is recognized and recalled better than content presented in a neutral or negative emotional context contributes to work on affect in SLA, extending our understanding of how positive and negative affect effect language learning. The results from the current study suggest the importance the role of affect may play in the classroom beyond motivation and anxiety. As such, the authors propose that the next steps in this research should be dedicated to emotional affect in language instruction and classroom material design. Additionally, this study would benefit from an investigation of upper intermediate and advanced L2 learners as well as delayed post-test tasks to determine if the facilitation of emotionally positive contexts persists beyond the initial task. Finally, this research should aim to continue to expand the investigation of affect and SLA. Looking at a wider variety of positive and negative emotions, such as active emotional states (e.g., excitement and anger) and passive emotional states (e.g., depression and contentment) would allow for a more nuanced understanding of how emotional presentation affects learning. This could be accomplished by developing

methodologies that focus on learners' emotional interpretation of a story in conjunction with learning task objectives.

In considering the classroom, the results presented in this study are not meant to suggest that language instructors should avoid serious topics such as natural disasters or current events that may be negative. Rather, instructors should strive to create an overall positive classroom atmosphere that, as the broaden-and-build theory (Fredrickson, 1998, 2001) suggests, allows students to broaden their thought-action repertoires to engage meaningfully with the course material. In discussing more serious topics that may stir negative affect, it may be beneficial to conclude the discussion with an optimistic spin by investigating potential solutions or discussing organizations that work to combat the problem. Iacozza et al. (2017) suggest that learning a foreign language in a formal academic environment does not provide the context for L2 speakers to establish strong bonds between their L2 and emotional content. The results reported in this study suggest that teaching language with an emotional tilt may facilitate lexical learning. Taking these results together, it seems clear that developing course materials that take emotional context into account is advantageous for the development of competent L2 speakers.

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Appendix. Image stimulus by word for each experimental condition.

	Positive condition	Negative condition	Neutral condition
Sojable			
Zorato			
Terulo			
Garente			

Jufena			
Plinico			
Turina			
Colfante			
Gasicho			

Mifesco			
Rapristo			