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# Mapping Emotion-related Words in Psycholinguistics: A Scoping Review for the Spanish language

# Mapeo de palabras relacionadas con la emoción en psicolingüística: una revisión de alcance para el idioma español

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## Abstract

Psycholinguistics has provided a broad spectrum of data available for many academic purposes from which one relevant area deals with the interplay between language and emotions. Thus, this review provides a framework for organizing past and guiding future research on the psycholinguistics of Spanish language associated with the affective domain. A scope review methodology was chosen for the final selection of 43 articles published from 2000 to 2019. The articles are organized according to several categories of analysis, giving some lights on the nature of the evidence, taking into consideration: subjects of study; characteristic variables under investigation, and instruments and / or approached methodologies. Finally, a brief discussion is conducted on the prospective, and applicability of this research line.

**Keywords:** Scope review, psycholinguistic, linguistic norms, Spanish, emotions.

## Abstract

La psicolingüística ha proporcionado un amplio espectro de datos disponibles para muchos fines académicos donde un área relevante se ocupa de la interacción entre el lenguaje y las emociones. Esta revisión proporciona un marco para organizar y guiar nuevos estudios sobre la psicolingüística del idioma español y el dominio afectivo. Para ese propósito, mediante una metodología de revisión del alcance, se seleccionaron 43 artículos publicados entre 2000 y 2019. Los mismos se organizan de acuerdo a varias categorías, que dan luces sobre la naturaleza de la evidencia, tomando en consideración: sujetos de estudio; variables características bajo investigación e instrumentos y/o metodologías abordadas. Finalmente, se presente una breve discusión sobre la aplicabilidad y alcances de esta línea de investigación.

**Palabras claves:** Revisión de alcance, psicolingüística, normas lingüísticas, Español, emociones.

## Introduction

This review exposes academic works from 2000 to 2019 associated with the psycholinguistic of Spanish language and the affective domain. Such a lengthy period was chosen considering the absence of extensive reviews for this specific subject in the last two

decades, and so far, a preliminary search proved still has a manageable amount of references which makes them possible to be collected in one review. This review is partially inspired by the work done by Buechel and Hahn (2018), to foster research in a mapping approach to emotion-based lexicons in order to expose common characteristics and visualize current research trends.

This review is structured as follows: (a) a brief exposition is presented about the existing literature related to the psycholinguistic of Spanish language (hereinafter PSL); (b) two questions are posed to serve as guidelines for the analysis; (c) an exposition of the method, articles' criteria, and selection procedure; (d) a description of the finding's arrangement in two subsections, one circumscribed to the main articles on the topic from the selected period; and the second, which includes a panoramic exposition of the most common variables under psycholinguistic scrutiny; lastly (e) some final thoughts on the prospective of this research line.

For the sake of readiness of the following pages, this review is exposed, where possible, from a two-fold reader's perspective, describing the relevant issues in a technical psycholinguistic jargon, but simultaneously being readable enough within the extension limits of a scientific review.

**Background: How much research exists today on PSL?**

At the best of our possibilities, a starting point can be found in the early works of Algarrabel, Ruiz, and Sammartin (1996); and the many contributions of authors like Campos and Sueiro (1991); and Campos (1989a; 1989b) in emotionality and Castilian words; all aimed to build psycholinguistic norms for Spanish language on relatively large sets of words. To be here highlighted is the review done by Pérez Sánchez, Campoy Menéndez, and Navalón Vila (2001); and the exhaustive check of 75 normative studies for Spanish-speaking population between 1927 to 2000, in which the evidence was assorted in sets of categories, depending on the object and variable under research. Although the studies selected by these authors include initial recollections of affective norms for Spanish language, there are no equally observed reviews on specific emotion-related words or emotions alone.

From the year 2000 to this day, a plethora of studies on PSL can be recalled with a methodological maturity indicative of the passage of time, as well as many updated normative studies and lexicon building works can be recalled (e.g.: Hinojosa *et al*., 2016;

Corral, Ferrero, & Goikoetxea, 2009; Piñeiro, & Manzano, 2000). This progressive scientific development has meant an expansion for the discipline, but also an integration to other areas, particularly cognitive neuroscience (e.g.: Beatty-Martínez, & Dussias, 2019; Verhoeven, Perfetti, & Pugh, 2019; Varo Varo, 2017). However, when the search-keys hit words directly related to affection and emotions, the number of references is significantly reduced to less than a hundred, a small number accordingly to today's standards. At a first glance, results orbit around three main areas. The first area embraces a trendy field called "Emotion mining" or "Sentiment analysis" for large amount of data, and it is characterized by the study of words classifications and the underlying emotions behind them, where many studies associated with Spanish language can be recalled (e.g.: Aguasvivas *et al*., 2018; Plaza-del-Arco, Molina-González, Jiménez-Zafra, & Martín-Valdivia, 2018; Navas-Loro, Rodríguez-Doncel, Santana-Pérez, & Sánchez, 2017). The second area reaches the mapping of emotion-related words through the creation of affective norms. The third area recalls studies on language acquisition and development, a research line with a large and current list of references for Spanish language (e.g.: Schaars, Segers, & Verhoeven, 2019; Hijazo-Gascón, & Llopis-García, 2018; Berger, Crossley, & Kyle, 2017). This review mostly deals with the second area, and in a lesser degree with the third one.

Along with research on PSL that considers standard psycholinguistic variables that refer to the affective domain underneath the umbrella of the dimensional approach to emotions (Harmon-Jones, Harmon-Joness, & Summerell, 2017), like the creation of norms for variables such as valence, arousal, and dominance (e.g.: Salaz Zárate, 2018; Ferré, Guasch, Martínez-García, Fraga, & Hinojosa, 2016; Manoiloff, Artstein, Canavoso, Fernández, & Segui, 2010), novel variables have also recently been put under examination. For instance, newer studies expand either in amplitude, approaching norms of valence, and arousal for a bigger amount of words (Stadthagen-González, Imbault, Pérez, & Brybaert, 2016); or in depth, including other variables such as familiarity and manipulability (Moreno-Martínez, Montoro, & Rodríguez-Rojo, 2014); concreteness (Vega, & Fernández, 2011); and / or subjective age-of-acquisition (hereinafter AoA) (Alonso, Fernández, & Diez, 2014; Cuetos, Samartino, & Ellis, 2012; Perez, & Navalon, 2005).

Likewise, other studies have also tried to define norms for emotion-related words, but through the discrete theoretical approach to emotions (e.g.: Harmon-Jones *et al*., 2017; Ogarkova, & Soriano, 2018; Ferré *et al*., 2016). Beyond that, studies associate these

traditional psycholinguistic variables with others more linguistic in nature, to listed a few such as: the measurement of lexical decision (González-Nosti, Barbón, Rodríguez-Ferreiro, & Cuetos, 2013); semantic ambiguity (Haro, Ferré, Boada, & Demestre, 2016); norms for words associations (Barrón-Martínez, & Arias-Trejo, 2014); miscellaneous of objective and subjective norms (e.g.: graspability, familiarity, color vividness, and others) associated with motor attributes (Diez-Álamo, Diez, Alonso, Vargas, & Fernández, 2017); semantic feature production (Vivas, Vivas, Comesaña, García, & Vorano, 2016); oral frequency (Alonso *et al*., 2011); norms for verbs (Gil-Vallejo, Coll-Florit, Castellón, & Turmo, 2017); taking Spanish into perspective with other languages (Palogiannidi, Iosif, Koutsakis, & Potamianos, 2015); building digital repositories for Spanish lexicons (Duchón, Perea, Sebastian-Galles, Marti, & Carreiras, 2013); and othes relevant studies to be recalled (e.g.: Arango-Lasprilla, & Rivera, 2017; Luna, Marino, Silva, & Acosta Mesa, 2016; Kuppens *et al*., 2016).

Although all the sketched-out studies have different scopes, there are no published reviews in the last two decades on the relationship between language and the affective domain in Spanish. Some works included certain minor revisions within the article's state of art, for instance, Díez-Álamo, Diez, Wojcik, Alonso, and Fernández (2018); Hinojosa and colleagues (2015); Moreno-Martínez and colleagues (2014), just outwardly touch the whole spectrum of existing references on the subject. Most of the studies consider affective norms for general lexicons, but not specific emotion-related words or emotions itself, therefore, the main aim of this review is to primarily address a broader scope of articles in the PSL beyond just the normative approach, but including it. It is important to give clarity and order to the available empirical evidence to facilitate the work of future researchers, contributing to the enrichment of psycholinguistic, as well as other close-related disciplines.

## Method

### Research questions

In pursuit of the above, two research questions come up as guidelines for this review: (1) Which are the most relevant studies on PSL related to the affective domain for the defined period 2000-2019? And, (2) Which are the most studied variables?

### Design and analytical approach

A scope review approach was chosen due to the broad possibilities this method offers for mapping a topic in terms of volume, nature, and characteristics of the evidence, providing conceptual clarity about a specific field, especially when it has not yet been extensively reviewed. Scoping reviews are a relatively new approach for which there is not yet a formal definition (Daudt, van Mossel, & Scott, 2013); but is commonly referred as a: "mapping, a process of summarizing a range of evidence in order to convey the breadth and depth of a field" (Levac, Colquhoun, & O'Brien, 2010, p.1); and a method to: "examine the extent, range, and nature of research activity in a topic area (…) summarize and disseminate research findings; and identify research gaps in the existing literature (…)" (Pham *et al*., 2014, p.372). This review is structured adopting the general constitutive steps given by Munn and colleagues (2018), according to: (1) Identifying research questions; (2) Identifying relevant studies; (3) Study selection; (4) Charting the data; and, (5) Summarizing and reporting the results.

**Data source, criteria, search strategy, and selection procedure**

*Criteria for databases selection*

The selection of the databases was made following a general relevancy order, stating four sources. Scopus is a citation indexing service, with many features to track research, and a solid representation of social sciences and humanities. Similarly, WoS (Web of Science) provides a comprehensive citation search, and gives access to multiple databases, which allows for in-depth exploration of specialized sub-fields. Meanwhile, EBSCO offers library resources in academic, medical, education, public library, and law, among others. Lastly, sciELO (Scientific Electronic Library Online) is a bibliographic digital database created to meet the scientific communication needs of developing countries.

*Criteria for articles selection*

Five selection criteria were applied to define the articles which belong to this review scope: (1) Articles indexed in any of the mentioned four large databases; and, (2) Articles published during the last 19 years: from 02.01.2000 to 31.04.2019; and, (3) Articles that cover Spanish alone or include it besides other languages; and / or, (4) Articles that incorporate any objective linguistic variables (e.g.: words prevalence; word length, frequencies, and so on); along with any subjective psycholinguistic variables (e.g.: valence,

arousal, familiarity, imageability, and others; for all the variables taken into account refer to tables 6a and 6b); and / or, (5) Articles that research the affective domain (affective norms, emotion-related words, and / or emotions alone). The searching key-words were: (a) Main key-words: psycholinguistics; and; emotions; and / or; affective; (b) Additional key-words: valence, arousal, dominance, and sentiments; (c) Limitation key-word: Spanish. The additional keywords were used to ensure that every article within the chosen criteria emerged, however, this was found redundant for the final number of selected articles. Similarly, regarding the criteria (1), a general search on popular web-based engines was performed to check articles worthy to be included, but the results were for the most part duplicates or didn't completely fit into the criteria.

*Article selection procedure*

After an initial number of preselected articles, a second procedure was conducted in order to refine the article recollection within a funnel approach, through PRISMA flow's chart diagram, suggested by Liberati and collaborators (2009). In order to reach this purpose, the following steps were performed: (a) a preliminary identification of all articles that fulfill the five criteria from above section (Criteria for articles selection), then eliminating those outside these criteria after checking titles, and abstracts; (b) eliminating duplicates; (c)screening preselected articles by careful reading of their methodological characteristics and main findings; (d) checking all references for each pre-selected article up to this point, and picking out all those references that fulfill the criteria for articles selection, from b to e, to ensure any significant article for this period doesn't get lost; (e) full reading of all up to now preselected articles; and, (f) final eligibility.

Results are presented in table 1 above. To ensure a reliable selection procedure, the Mendeley Desktop software, version 1.19.3., was used to look for titles and duplicates, but it was also done with a simple inspection of printed preselected articles.

Table 1

*Preselected articles by data-bases according to PRISMA*

| Data-bases | Main search-keys | | | Total after first selection * | Total after second criteria selection (PRISMA) |
|---|---|---|---|---|---|
| | Psycholinguistics and Spanish | Psycholinguistics; Spanish; and affective | Psycholinguistics, Spanish; and, emotion | | |
| (1) | 321 | 15 | 13 | 28 | 26 |
| (2) | 176 | 7 | 9 | 15 | 15 |
| (3) | 25 | 49 | 50 | 99 | 2 |
| (4) | 13 | 0 | 0 | 0 | 0 |
| Total* | 536 | 66 | 73 | 139 | 43 |

(1) Scopus. (2) WoS. (3) EBSCO. (4) sciELO.

*These numbers do not correspond to summations, but totals after the selection procedure.

*Issues not scoped in this review*

Some research lines were not considered for a few topics and areas. Firstly, Sentiment Analysis for Spanish language was not included, because some extensive work had already been done in this field (Henriquez Miranda, Guzmán, & Santamaria, 2017). Secondly, language learning and teaching as well as language development were not part of this review, mostly due to the reason that they are not primarily focused on affective norms, larger numbers of words and / or participants; however, some exceptions were made according to the specific subjects under research (see tables 6a and 6b). Likewise, articles which deal only with pure objective linguistic variables were not part of this review either (e.g.: word counts, frequencies, prevalence, and so on), but some of those articles which approach strong subjective and / or cognitive variables, such as AoA, concreteness, imageability, among others, were kept.

## Results

A final number of 43 articles was scoped (42 of them are studies published in regular scientific journals, and one is a conference report), from which 40 correspond to empirical researches and three to theoretical-descriptive studies. From the total number of articles, 18 were performed on university students, one on adult native speakers, another one on adults

with a clinical diagnosis (depression and anxiety); one article was carried put on children; and one last more where is not specified. The rest (20) was conducted on pre-existent databases for psycholinguistic purposes. The students were mostly from the first years of humanities, and health-related degrees. High dispersion and differences between the selected studies were found after the selection procedure, as well as between methodologies, research designs, and employed databases, involving findings that lead to diversity with many common points that could be extracted.

**General categorizations (question #1)**

*General topics approached in PSL on the affective domain*

From the selected studies, four sub-groups emerge according to their main subjects and / or topics of research, dealing consequently with: (a) Affective norms; (b) Affective norms and specific emotion-related words; (c) Affective norms, specific emotion-related words, and simultaneously semantic variables; and, (d) Other uncommon variables and / or research topics that may include or not the above.

The highest number of selected articles explores the interdependence between language and emotions from the traditional assumption that conceptualizes them along the continuum of the already mentioned three dimensions: valence, arousal, and in some cases, dominance; showing that the researcher's focus of interest is largely situated on elaborating affective norms for Spanish words. Therefore, it prevails the study of psycholinguistic norms on nouns and verbs for adults and children populations, and these mentioned variables (Rodríguez-Ferreiro, & Davies, 2019), along with measurements of words prevalence, subjective and objective AoA, imageability, among many others that can be found (Stadthagen-González *et al*., 2016; Alonso *et al*., 2015; Álvarez, & Cuetos, 2007; Redondo, Fraga, Comesaña, & Perea, 2005; Izura, Hernández-Muñoz, & Ellis, 2005; Piñeiro, & Manzano, 2000). However, a deeper look shows an attempt to expand this traditional approach, leading to a growing interest in new research variables in psycholinguistics, but at the same time, to make possible the integration with other disciplines on the underlying neurocognitive processes in language usage (Binder *et al*., 2016). Thus, it is relevant to highlight here, from the selected articles, the novel research on sensory experience ratings (Diez-Álamo *et al*., 2018); based on the current field of grounded or embodied cognition; or the study of body–object interaction for Spanish language in terms of the given value a

person perceives on the possibility that its own body can physically interact with a word's referent (Alonso *et al*., 2018).

After checking the second subgroup of articles, approaching affective norms for specific emotion-related words, it is noticeable that it had commonly gone through using the discrete theoretical model of emotions, and is essentially focused on the study of basic differentiated emotions (Stadthagen-González, Ferré, Pérez-Sánchez, Imbault, & Hinojosa, 2018; Ferré *et al*., 2016; Marmolejo-Ramos *et al*., 2016; Hinojosa *et al*., 2015). It also explored more complex emotional states such as, anxiety and depression (Pérez Dueñas, Acosta, Megias, & Lupiáñez, 2010); or words with a special emotional connotation, such as death (Fernández-Alcántara *et al*., 2017); and / or norms for words-related to specific terms like humanity, and the differences when these kind of words are attributed to ingroup or outgroup people (Rodríguez-Pérez, Betancor-Rodríguez, Ariño-Mateo, Demoulin, & Leyens, 2014). Special attention had been given to the emotion of anger, because it is considered a universal cross-cultural experience, and part of common theoretical models on primary emotions (Ogarkova, & Soriano, 2018; Orgakova, & Soriano, 2014; Soriano, 2003; Kövecses *et al*., n.d.). Other studies in PSL explore the cross-cultural claim that affective-ratings for words differ depending of the country where they are spoken, for instance, positive emotions are described similarly across many languages, Spanish included, but negative emotions are not (Reali, & Arcienagas, 2014; Orgakova, & Soriano, 2014); and / or they describe the cultural role and differences in attributing emotion-related words to beverages from several Spanish speaking countries (van Zyl, & Maiselman, 2016; van Zyl, & Maiselman, 2015).

Some articles combine all observed variables: affective norms, specific emotion-related words, and semantic variables. Addressing the same order that the research usually takes in this field, early studies in this category approached semantic variables through a normative approach (e.g.: valence, arousal, dominance, lexical availability, AoA, imageability, familiarity, and others); giving them normative values (Guasch, Ferré, & Fraga, 2015; Izura *et al*., 2005); or setting them in predefined semantic categories, for example: living and non-living objects (Vivas *et al*., 2016; Moreno-Martínez *et al*., 2014); and / or humans, animals and objects (Ferré, Guasch, Moldovan, & Sánchez-Casas, 2011). Specific list of words has been normed referring to attributes of a specific semantic category (Díez-Álamo *et al*., 2017); for example, upper and lower spatial location for three emotions: joy, surprise, and sadness (Marmolejo-Ramos *et al*., 2016).

A specific collection of articles for each category by topics under study can be found in Table 2. Under the category "Others", studies that approach only once, one or more variables not possible to find in any other studies, are arranged. In some cases, a few articles go under a double classification, considering that the categories created are often interlaced.

Table 2

*Articles by general topics on PSL and the affective domain*

| Categories | Authors |
|---|---|
| Affective norms | Rodríguez-Ferreiro, & Davies, 2019; Diez-Álamo *et al*. (2018); Alonso *et al*. (2018); Fernández-Alcántara *et al*. (2017); Hinojosa *et al*. (2016); Stadthagen-González *et al*. (2016); Alonso *et al*. (2015); Alonso *et al*. (2014); Redondo, Fraga, Padrón, & Comesaña (2007); Moreno-Martínez *et al*. (2014); Wilson, Cuetos, Davies, & Burani (2013); Davies, Barbón, & Cuetos (2012); Manoiloff *et al*. (2010); Álvarez & Cuetos (2007); Redondo *et al*. (2005); Izura *et al*. (2005); Piñeiro, & Manzano (2000). |
| Affective norms and specific emotion-related words | Stadhagen-González, Ferré, Pérez-Sánchez, Imbault, & Hinojosa (2017); Ferré *et al*. (2016); Marmolejo-Ramos *et al*. (2016); Hinojosa *et al*. (2015); Rodríguez-Pérez *et al*. (2014); Ogarkova, & Soriano (2014); Pérez Dueñas *et al*. (2010); Delgado (2009); Redondo *et al*. (2007); Redondo *et al*. (2005). |
| Affective norms, specific emotion-related words, and sematic categories | Ogarkova, & Soriano (2018); Fernández-Alcántara *et al*. (2017); Sita Farias (2017); Palogiannidi, Iosif, Koutsakis, & Potamianos (2015); Guasch, Ferré, & Fraga (2015); Reali & Arciniegas (2015); Guasch *et al*. (2015); Marmolejo-Ramos *et al*. (2014); Montoro, Elousa, Contreras, & Jiménez-Jiménez (2014); Ferré *et al*. (2011); Soriano (2003). |
| Others norms and / or research topics | Alonso *et al*. (2018); Diez-Álamo *et al*. (2018); Fraga, Guasch, Haro, Padrón, & Ferré (2018); Adelman, Estes, & Cossu (2018); van Zyl, & Meiselman (2016); Saravia, Argueta, & Chen (2016); Orgakova, Soriano, & Gladkova (2016); van Zyl, & Meiselman (2015); Soriano, & Valenzuela (2015); Díaz Rangel, Sidorov, & Suárez Guerra (2014). |

Self-made table.

*Articles approaching PSL on the affective domain from a theoretical perspective*

Three articles from the selected references fully belong to this category: Soriano (2003), and the comparative study of anger in Spanish and English; Sita Farias (2017), and the study of paraphrases; and Kövecses *et al*. (n.d.), and the study of anger Metaphors across

Languages. However, the total screening allowed to delimit two general theoretical frameworks for the research of emotions in PSL: the discrete-emotion approach; and the dimensional perspective. Accordingly, the first one posits that the basic elements of emotions are discrete entities such as anger, fear, joy, and so on; and the second one suggests that the elementary building blocks or elements of emotions are basic dimensions in a continuum, such as arousal and valence, and in a lesser degree dominance. This last model is sometimes denominated "circumplex model" (Stadhagen-González *et al*., 2017). These approaches are traditional for the research of emotions in cognitive psychology, and can be clearly seen in the selected articles in PSL. A collection of articles for each theoretical perspective can be found in the table 3.

Table 3

*Theoretical models on emotions in PSL by authors*

| Categories | Authors |
|---|---|
| Discrete approach to emotions | Ogarkova, & Soriano, 2018; Adelman *et al*. (2018); Ogarkova, Soriano, & Gladkova (2016); Reali, & Arciniegas (2015); Diaz Rangel *et al*. (2014); Rodríguez-Pérez *et al*. (2014); Delgado (2009); Soriano (2003). |
| Dimensional approach to emotions | Fernández-Alcántara, *et al*. (2017); Stadhagen-González *et al*. (2016); Guasch, Ferré, & Fraga (2015); Palogiannidi *et al*. (2015); Ferré *et al*. (2011); Redondo *et al*. (2007); Redondo *et al*. (2005). |
| Both | Stadhagen-González *et al*. (2017); Ferré, Guasch, Martínez-García, Fraga, & Hinojosa (2016); Marmolejo-Ramos *et al*. (2016); Hinojosa *et al*. (2015); Pérez Dueñas *et al*. (2010). |

Self-made table.

*Articles approaching PSL and specific emotion-related words*

The third group of articles that are possible to characterize, falls into the category of the affective domain on specific emotion-related words under the lens of psycholinguistic analysis, not primarily related to a normative approach, although included in many cases. The findings presented for this group provide evidence that highlight the theory about the modulation in which emotions incur in an undergoing cognitive process (Fontaine *et al*., 2013). The methodologies behind were predominantly conducted under the dimensional theoretical model of emotions, where research is oriented towards testing the valence and arousal of words within different experimental paradigms, designs, and tasks (Ferré *et al*.,

2016); and then exploring its association with other lexical and / or semantic variables (Stadthagen-González *et al*., 2018; Palogiannidi *et al*., 2015).

Although there is no visible agreement on how many basic emotions exist, PSL research mostly embraces happiness, disgust, anger, sadness, fear, joy, and surprise; but also, in a lesser degree, others like anticipation, trust or resentment (see tables 6a and 6b). Exemplary studies to this line expose evidence about emotion-related words such as joy and sadness, and their affective properties, and as was expected for this kind of emotions, a highly positive valence was shown for words associated to happiness, and on the contrary, a highly negative valence for words associated to sadness (Stadthagen-González *et al*., 2016; Ferré *at al*., 2016; Hinojosa *et al*., 2015). Also, neutral words have been approached in PSL in comparison with emotion-related ones, over the theoretical presumption that the neurocognitive resources in the brain are deposited where emotions arise, with an impact not only in simple semantic structures, but also in complex ones (Stadthagen-González *et al*., 2017; Hinojosa *et al*., 2015; Ferré *et al*., 2011). Furthermore, in many cases the article's authors don't use any explicit theoretical model on emotions, but an evidence-based empirical approach, with some exemptions, for example, in Pérez Dueñas and colleagues (2010), the Plutchik model of eight emotions is recalled; and / or the Conceptual Metaphor Theory (CMT) worked out by Ogarkova and Soriano (2018). Other studies have tried to determine the universal characteristic of emotions, for instance, looking for a consistent order in the Spanish basic emotions-word usage for different periods and native speaker countries (Delgado, 2009); with findings that suggest these words are consistently ordered by their frequency of use.

The study of gender differences has also yielded some interesting findings in PSL. Positive correlations had been pointed out for emotion-related words in valence and arousal, meaning that males and females distinctly agree in both dimensions (Hinojosa *et al*., 2015). Certain words show bigger differences by gender when rating them accordingly to the emotional experience that can be immediately associated, for example: men rate the word "soccer" higher than women in relation to the emotion of happiness that can produce, and on the contrary, women rate higher the word in Spanish "matador" (killer) in relation with the emotion of disgust that this word provokes (Stadthagen-González *et al*., 2018). This confirms that male and female participants tend to rate words in a similar vein within the group, but different in between, all in line with other studies in the area (Ferré *et al*., 2016); although

other former studies have not found such differences (Redondo *et al*., 2007). Other studies had also shown differences by gender in the production of representative emotional verbal contexts, where females produce more emotional contexts than men (Marmolejo-Ramos, Montoro, Elosua, Contreras, & Jimenez-Jimenez, 2014). A specific recollection of articles for each psycholinguistic variable and each emotion can be found in tables 6a and 6b.

*Articles approaching PSL and digital lexicons*

Another relevant topic to highlight is the creation and use of web-based depositories, digital norms and / or software for the study of the affective domain in psycholinguistics. This research line traditionally aims to build significant lists of words according to a set of criteria in regard to the use of a word in a lexicon (e.g.: percentages, frequency and other descriptors); or the subjective measurement a person obtains in regard to a word (e.g.: valence, arousal, dominance and many others already mentioned variables); to be later stored in data-bases, then accessed by researchers. For that, a robust research in linguistics exists for the enrichment of these research tools, also in some cases available for PSL online, as paid, and / or open sources. Most of them correspond to updates of English sources (e.g.: ANEW and / or B-Pal); or specific packages to be installed in software for psycholinguistic purposes.

It is important to recall some relevant concepts prior to the categorization. A corpus is a broad sample of written or spoken language that is considered representative of the standard of some determined period (Lavid, 2005); subsequently, LexEsp refers to any computerized lexicon of Spanish language. Key Word in Context (KWIC) determines the context in which a given term is used in the Current Spanish Reference Corpus (CREA); which is a corpus representative of the current state of the Spanish language developed by the RAE (Royal Spanish Academy). Diachronical Spanish Corpus (CORDE) is a textual corpus of all times and places in which Spanish was spoken up to 1974, in which its borderlines with CREA. Spanish Lexical Database (EsPal) is designed to be a source of information containing all the possible properties of Spanish words. The Spanish adaptation of ANEW (Affective Norms for Words) corresponds to a word list with scores for valence, dominance, and arousal. Similarly, the Madrid Affective Database for Spanish (MADS), includes affective norms. BuscaPalabras or B-Pal is the Spanish version of the original N-Watch program for English stimuli. Online Ratings of Visual Stimuli (Or-Vis) refers to repositories of data. Self-Assessment Manikin (SAM) is a non-verbal pictorial assessment technique that directly

measures the pleasure, arousal, and dominance associated with a person's affective reaction to a wide variety of stimuli. EmoFinder is a web-based search engine for Spanish word properties/dimensions from different normative databases (consult table 4). Finally, LIWC2015 is a software with built-in dictionaries that accounts for all words in each text, and calculates the percentage of total words that match each of the dictionary categories (Pennebaker, Boyd, Jordan, & Blackburn, 2015).

Table 4

*Articles approaching PSL on the affective domain by digital lexicons*

| Preexistent lexicons, digital repositories, and / or software | Authors |
|---|---|
| Corpus Search (LexEsp) | Hinojosa *et al*. (2015); Pérez Dueñas *et al*. (2010). |
| Spanish adaptation of ANEW | Fernández-Alcántara *et al*. (2017); Ferré *et al*. (2016); Stadthagen-González *et al*. (2016); Hinojosa *et al*. (2015); Palogiannidi *et al*. (2015); Ferré *et al*. (2011); Redondo *et al*. (2007). |
| Madrid Affective Database for Spanish (MADS) | Hinojosa *et al*. (2016). |
| B-Pal | Davis, & Perea (2005). |
| Online Ratings of Visual Stimuli (Or-Vis) | Diez-Álamo *et al*., (2018). |
| Self-Assessment Manikin (SAM) | Redondo *et al*. (2005). |
| Web-based search engine for Spanish emotional words (EmoFinder) | Fraga *et al*. (2018). |
| Key Word in Context (KWIC) for Current Spanish Reference Corpus (CREA) | Orgakova, & Soriano (2018); Reali, & Arciniegas (2014); Soriano, & Valenzuela (2009); Delgado (2009); Soriano (2003). |
| Diachronical Spanish Corpus (CORDE) | Delgado (2009). |
| LIWC2015 | Adelman, Estes, & Cossu (2018). |

Self-made table.

**Variables comparison (question #2)**

A second approach to this review was done by building a panoramic view of the most frequently approached variables in PSL for the affective domain. The collected variables were classified in two classes: psycholinguistic and emotional per se, and this was built to encompass a longer and wider view of the affective domain in psycholinguistic research, simultaneously including most common studied variables, and both existent theoretical approaches to emotions (dimensional and discrete).

Approached variables were collected, listed and then exposed according to above-mentioned criteria, which resulted in three differential categories that are exposed in tables 6a and 6b: (1) The first one covers 17 variables commonly belonging to the psycholinguistic research field: Valence; Arousal; Dominance; Concreteness; Familiarity; Manipulability; Imageability; Context availability; Age od acquisition; Sensory experience; Happiness; Disgust, Anger; Sadness, Fear; Joy, Surprise; (2) the second one embrace all covered languages and total word numbers by each article; and (3) The third one incorporates other variables purely linguistic in nature that are beyond the scope of this review, but included in reviewed articles. This panoramic view has the intention to help researchers to easy define new starting-points for further scientific databases explorations. In some cases, the authors use numerous linguistic variables with complex statistical analysis, and for that reason the category "Others" was created. Conversely, this same category was used for emotions referring to variables not frequently approached by the discipline (e.g.: affective norms for clinical diagnosis with a strong affective component as it is, for example, depression).

On the following table (table 5), a series of terms, acronyms used in tables 6a and 6b, are defined in order to make them easy to follow.

Table 5

*Brief theoretical definition of psycholinguistic variables from the reviewed articles*

| Variables | Definitions* |
|---|---|
| Word number | Total number of words. |
| Valence | Pleasantness evoked by a word while reading it. |
| Arousal | Intensity of a word, rated from stimulated to relaxed. |
| Dominance | Degree to which the word makes feel in control. |
| Concreteness | Degree to which a word refers to a perceptible or palpable entity. |
| Manipulability | How easily words can be handled and used. |
| Familiarity | Frequency with which a word is seen, heard or used daily. |
| Imageability | Intensity with which a word arouses images. |
| Context availability | Ease with which a word may call to mind a context. |
| AoA | Age a word is believed to be learned. |
| Sensory experience (SERs) | Extent a word evokes a sensory experience. |

Self-made table.

* These definitions are extracted from the cited literature across this review.

## Discussion

The aim of this work was to carry out a panoramic collection of articles from 2000 to 2019, on the affective domain for Spanish language and from the point of view of the psycholinguistic research. The findings made it possible to positively answer both guiding research-questions, firstly in regard to most relevant studies on PSL related to the affective domain between referred years, and secondly, with respect to most studied variables in this specific research line. This large but still manageable number of reviewed studies provides a good-enough understanding of this research field's current scope and trends, and in a word, research on PSL follows the same observed tendencies for the study of English language, with a clear emphasis on normative studies and the discrete models of emotions. It is also visible a lack of studies of PSL on other dimensions more applied in nature, therefore this state of the art may represent a fertile field to be explored by researchers, as some new works recently had already been done. For instance, Pérez-García and Sánchez (2019), had studied the study of the perception and expression of emotions as a linguistic category in a second-language learning' context. Besides that, this review expects to spike the interest for future studies in PSL to set up newfangled and more integrated research proposals, where emotions are taken into consideration, especially in regard to highly specialized current research trends - for example - what Hinojosa, Moreno, and Ferré had done (2020) about affective neurolinguistics as a conjunction of many research disciplines.

Finally, the applicability of the empirical evidence must be ideally reachable, not only by researchers, but by any interested professionals from any applied or close-related field. It is then hoped this review will constitute a contribution toward this direction for this promising and well-grounded research field.

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Table 6a

*Selected articles and its correspondently psycholinguistic variables and emotion-related words under study*[1]

| | | | Psycholinguistic variables | | | | | | | | | | | Emotions | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dimensional approach | | | | | | | | | | | Discrete approach | | | | | | | |
| Articles | Language | Word number | Valence | Arousal | Dominance | Concreteness | Familiarity | Manipulability | Imageability | Context availability | AoA | SERs | Others* | Happiness | Disgust | Anger | Sadness | Fear | Joy | Surprise | Others |
| Rodríguez-Ferreiro, & Davies (2019). | es | NA | x | | | | | | | | | | x | | | | | | | | |
| Alonso *et al*. (2018). | es | 750 | | | | | x | | x | | | | x | | | | | | | | |
| Ogarkova, & Soriano (2018) | en, ru, es | NA** | | | | | | | | | | | x | | | x | | | | | **x** |
| Diez-Álamo *et al*. (2018) | es | 5500 | | | | | | | | | | x | x | | | | | | | | |
| Adelman, Estes, & Cossu (2018). | en, es, nl, de, pl | 37,000 | x | x | | | | | | | | | x | | | | | | | | |
| Fraga *et al*. (2018). | es | 16,375 | x | x | | x | x | | | x | x | | | x | x | x | x | x | | | |
| Stadthagen-González *et al*. (2018). | es | 10,491 | x | x | | | | | | | | | | x | x | x | x | x | | | |
| Fernández-Alcántara *et al*. (2017). | es | 125 | x | x | | | | | | | | | x | | | | | | | | x |
| Sita (2017). | es, pt, it, fr | NA | | | | | | | | | | | x | | | | | | | | x |
| Marmolejo-Ramos *et al*. (2016). | en, hin, ja, es, vi, de | NA | x | | | x | | | x | x | | | x | | | | x | | x | x | |
| Ferré *et al*. (2016). | es | 2,266 | x | x | | | | | | | | | x | x | x | x | x | x | | | |
| Ogarkova *et al*. (2016). | ru, es, en | NA | | | | | | | | | | | x | | | x | | | | | x |
| Hinojosa *et al*. (2016). | es | 875 | | | x | | x | | | | x | x | x | x | x | x | x | x | | | |
| Stadthagen-González *et al*. (2016). | es | 14,031 | x | x | | x | x | | x | | x | | x | | | | | | | | |
| van Zyl, & Meiselman (2016). | en, es, pt | NA | | | | | | | | | | | x | | | | | | | | |
| Saravia *et al*. (2016). | es, en, fr | NA | | | | | | | | | | | x | | | | | | | | x |
| Hinojosa *et al*. (2015) | es | 875 | x | x | | | | | | | | | | x | x | x | x | x | | | |
| Reali, & Arciniegas (2015). | es | NA | | | | | | | | | | | x | | | | | | | | |
| van Zyl, & Meiselman (2015). | en, es | NA | | | | | | | | | | | x | | | | | | | | |

[1] Language code according to ISO 639-1.

Self-made table.
*Uncommon variables. **NA (non-applicable, referred to non-normative research, experimental designs which small number of participants and / or utilized stimuli, and theoretical works).

Table 6b

*Selected articles and its correspondently psycholinguistic variables and emotion-related words under study*

| | | | Psycholinguistic variables | | | | | | | | | | | Emotions | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dimensional approach | | | | | | | | | | | Discrete approach | | | | | | | |
| Articles | Language | Word number | Valence | Arousal | Dominance | Concreteness | Familiarity | Manipulability | Imageability | Context availability | AoA | SERs | Others* | Happiness | Disgust | Anger | Sadness | Fear | Joy | Surprise | Others |
| Alonso, Diez, & Fernández (2015). | es | 4640 | | | | | | | | | x | x | | | | | | | | | |
| Guasch, Ferré, & Fraga (2015). | es | 1400 | x | x | | x | x | | x | x | | | x | | | | | | | | |
| Moreno-Martínez *et al*. (2014) | es | 820 | | | | | x | x | | | x | | x | | | | | | | | |
| Alonso, Fernández, & Diez (2014). | es | 7,039 | | | | | | | | | x | | x | | | | | | | | |
| Rodríguez-Pérez *et al*. (2014). | es | 148 | x | | | | x | | | | | | x | | | | | | | | |
| Marmolejo-Ramos, *et al*. (2014). | es | NA* | | | | | | | | | | | x | | | x | x | x | x | x | |
| Ogarkova, & Soriano (2014). | en, ru, es | NA | | | | | | | | | | | | | | x | | | | | x |
| Diaz Rangel *et al*. (2014). | es | NA | | | | | | | | | | | | x | x | x | x | x | | x | |
| Wilson *et al*. (2013). | es | NA | | | | | | | x | | x | | | | | | | | | | |
| Davies *et al*. (2012). | es | 2764 | | | | | | | | | x | | x | | | | | | | | |
| Ferré *et al*. (2011). | es | 380 | x | x | | x | x | | | | | | x | | | | | | | | |
| Pérez Dueñas *et al*. (2010). | es | 238 | x | x | | | | | | | | | x | | | x | | | | | x |
| Manoiloff *et al*. (2010). | es, en, fr | 400 | | | | | x | | | | x | | x | | | | | | | | |
| Delgado (2009). | es | 103.184 | | | | | | | | | | | x | x | x | x | x | x | x | x | x |
| Soriano, & Valenzuela (2009). | es | NA | | | | | | | | | | | x | | | | | | | | |
| Redondo *et al*. (2007). | es | 1034 | | | | | | | | | | | x | | | | | | | | |
| Álvarez, & Cuetos (2007) | es | 328 | | | | | x | | x | | x | | x | | | | | | | | |
| Redondo *et al*. (2005) | es | 478 | x | x | | | | | | | | | | | | | | | | | |
| Davis, & Perea (2005). | es | NA | | | | | | | | | | | | | | | | | | | |
| Izura *et al*. (2005). | es | 500 | | | | | x | | x | | x | | x | | | | | | | | |
| Soriano (2003). | es | NA | | | | | | | | | | | x | | | x | | | | | |
| Piñeiro, & Manzano (2000). | Es | 15.428 | | | | | | | | | x | | x | | | | | | | | |

| | | | |
|---|---|---|---|
| Kövecses *et al*. (n.d.); | es, en, tr, hu | NA | x |

Self-made table.
*Uncommon variables. **NA (non-applicable, referred to non-normative research, experimental designs which small number of participants and / or utilized stimuli, and theoretical works).

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