Norming studies for lexicosemantic and affective characteristics of European Portuguese words: A literature review

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Words are widely used as stimuli in cognitive and linguistic research. As words may vary on various domains (e.g., lexicosemantic and affective), which can influence performance in many ways, it is essential to select them carefully. However, databases of European Portuguese words are still relatively scarce, and their presentation is spread in various sources. The aims of this work were: (1) to provide a review of the databases containing information on lexicosemantic, affective, and free association norming data for European Portuguese words published since the year 2000; (2) to summarize the definitions of the different variables; and (3) to combine in a single database the norming data available at this point. We found 25 databases with 18 containing lexicosemantic and affective norming data and seven containing word free association norms. These databases include words from various categories (e.g., nouns and adjectives), characterized on different variables (e.g., familiarity, imagery, valence, age of acquisition and animacy). This review provides a useful tool for researchers looking for Portuguese word-related resources. A thorough review of the databases, including some details about each one, is presented. The combined database is shared with the scientific community via the Open Science Framework: https://osf.io/9ta3y/.

Key words: Word norms, Lexicosemantic variables, Affective variables, Free association, European Portuguese.

Words are rich stimuli commonly used as materials in research across various areas such as linguistics, cognitive psychology, affective priming, social perception, among others. However, words can differ along several variables (e.g., concreteness, imagery, age of acquisition) that can impact the way they are processed. Sometimes the characteristics of the stimuli themselves are the object of the study but, in others, researchers need to equate stimuli sets on these characteristics to insure the internal validity of their work. Therefore, being knowledgeable about the studies that have collected information on these characteristics is crucial when selecting research materials.

According to Andrews and colleagues (2009), the mental representation of the meaning of the words can be learned through distributional and experiential variables. The distributional variables refer to “how words are statistically distributed across different spoken or written texts” (Verheyen et al., 2020, p. 1109), and include variables such as written frequency, mean bigram frequency and the orthographic neighborhood size. The experiential variables capture the “perceived attributes associated with the words” (Verheyen et al., 2020, p. 1109), and can be further divided into lexicosemantic (e.g., concreteness, imageability, familiarity and age of acquisition) and
affective variables (e.g., emotional valence, arousal); however, as the authors note, it’s not always simple to distinguish them. We should note that, although we are adopting this form of classifying the variables, other conceptualizations also exist (Brysbaert et al., 2019). This review focuses on studies that have reported norms for lexicosemantic and affective features of European Portuguese (EP)\textsuperscript{1} words and norms of free association of EP words.

Studies aiming to gather information on experiential variables of words usually require participants to provide their subjective assessment regarding specific features that they think best describe the words (Kremer & Baroni, 2011); this is based on their mental representation of the presented concept (Hyde & Jenkins, 1973; Kremer & Baroni, 2011). It is known that some experiential variables influence the way words are processed in various cognitive domains. For example, in memory, concrete words (that is, words that refer to things that may be experienced by the senses, such as chair) are better encoded and, therefore, better remembered than abstract words (that is, words not referring to material things, or that cannot be experienced by the senses, such as happiness), a phenomenon known as the concreteness effect (Paivio, 1991). On the other hand, Kousta and collaborators (2011) reported that, in semantic decision tasks, abstract words seem to take a processing advantage when compared to concrete words. However, as pointed out by the authors, this advantage seems to be (at least partially) explained by the fact that abstract words have more affective associations.

The effect of emotional valence (i.e., if a word has a positive or a negative emotional connotation) in cognition has also been exploited. For example, Carretié et al. (2008) conducted a lexical decision experiment in which participants had to identify if a string of letters corresponded to a word or not; importantly, the presented words differed on emotional valence (compliments, insults and neutral adjectives). Participants not only were more accurate, but also faster, at responding to compliments (positive-valenced words) than to insults (negative-valenced words).

Another example is animacy, which refers to whether something corresponds to a living / animate or a nonliving / inanimate entity (Caramazza & Shelton, 1998; Félix et al, 2020). Animacy has been identified as the best predictor of free recall, so people tend to recall animates (e.g., people and animals) significantly better than inanimates (e.g., objects; Nairne et al., 2013; see also Aka et al., 2020). The second-best predictor of free recall, identified by Nairne et al. (2013), was imageability, that is, the ease with which a word produces a mental image (e.g., television has high whereas evidence has low imageability). In spite of the fact that imagery and concreteness (mentioned above) correlate highly ($r=.88$, Soares et al., 2017), studies have revealed differences between them. For example, although concrete words tend to evoke a mental image more easily than abstract words (e.g., Paivio et al, 1968), some abstract words (namely, those denoting affective states; e.g., happiness), although scoring low on concreteness, possess high imageability ratings; in these cases, the high correlation between imagery and concreteness is not observed.

The variable age of acquisition (AoA) is the estimated age at which a specific word was introduced in the individuals’ vocabulary. This variable was been reported to be a significant predictor of word naming latencies (that is, when reading aloud, words that are acquired earlier are read faster than those acquired later), as well as of lexical decision latencies and accuracy. The influence of AoA in the cognitive processing of stimuli (namely, words) has been named the AoA effect (Cortese & Kahanna, 2007).

The individual experience with a word also influences the way it is processed. Such experience might be operationalized by subjective frequency (that is, a rating of how often a person is exposed to the word) or familiarity (i.e., the degree to which one finds a word familiar, considering one’s mental lexicon; Kuperman & Van Dyke, 2013). For example, the more frequent a word is considered to be, the faster one reads it (Kuperman & Van Dyke, 2013). Even though subjective word frequency is sometimes used to indicate familiarity, these variables differ in important ways. For instance, a

\textsuperscript{1}European Portuguese refers to the Portuguese language written and spoken in Portugal.
regression analysis performed by Balota et al. (2001) revealed that subjective frequency provides a better index to the exposure to a word than familiarity, whereas the later seems to relate more to a series of other words' characteristics (e.g., meaningfulness) than subjective frequency.

The semantic relatedness among stimuli is another variable of broad interest. This variable expresses how close two words are in terms of meaning; for example, words from the same category are semantically related (e.g., dress and shirt are both clothing), as are words that attempt to define another (e.g., apples are red; McNamara, 2005). Semantic relatedness can be captured in free association norms. In free association tasks, participants are usually asked to produce the first word that comes to their minds (target) when presented with a specific word (cue); the association between the cue and the target is often a lexicosemantic association (Altarriba et al., 1999), just to name a few. Similar norming studies for EP words also exist; these contain, for the most part, a relatively small number of words and each covers a limited number of variables. Besides, these studies have used different measurement scales (e.g., 9- and 7-point scales to measure the same variable), methods and contexts to collect their data (e.g., data collected individually or in group). They have also been published in various sources making it hard for researchers to easily find and use them. This often “duplicates” the work and efforts of researchers in that they opt to do their own pilot norming studies when they need to control for such variables.

This work aims to minimize this problem and to provide a useful tool for researchers by summarizing the existing norming databases covering lexicosemantic and affective variables, as well as norms of free association in EP. We define the variables as they were used in the corresponding studies and describe the main aspects of their procedures. Finally, we compiled the norming data available in these studies into a single database; it contains all the EP rated words, along with their scores as reported in each of the original studies. In spite of the above-mentioned differences among studies, we present evidence of discrepancies but also of communalities in the gathered data; these suggest that one can use some data from various studies in a safe way.

Method

We conducted our search for databases of European Portuguese words in Scopus and Web of Science, as well as in Portuguese journals – *Laboratório de Psicologia*, *Análise Psicológica* and
After a literature review on databases of words and lexicosemantic / affective variables (e.g., Rubin & Friendly, 1986; Wilson, 1988), we identified the following search terms of interest: familiarity [familiaridade], frequency [frequência], valence [valência], emotional valence [valência emocional], mental valence [valência mental], arousal [ativação], dominance [dominância], age of acquisition [idade de aquisição], concreteness [concreteza], imageability [imageabilidade], availability [disponibilidade], goodness, concept typicality [tipicidade] and animacy [animacidade]. The following additional terms were also used in the search procedure: word* [palavra*], Portuguese [português], Portuguese tongue [língua portuguesa], European Portuguese [português europeu], word database [base de palavras] and norming study [estudo normativo]. The search was conducted with all these terms in Portuguese and in English (see Appendix 1 for the searched keywords, and the results obtained in each source). We only considered studies that comprised EP written words as their basic unit of analysis (instead of text excerpts or spoken words, for example), that contained lexicosemantic / affective norming data, and that were published since 2000. As language has been changing with the introduction of new concepts (e.g., mouse can now mean both a rat or a computer device; Rodd et al., 2012), norming studies need to be time-adjusted (Comesaña et al., 2014). Thus, this time-period criterion was settled to present an up-to-date review of the existing databases that could be currently of use to other researchers. The search strategy used is presented in Figure 1.

References selected for a more detailed Reading:
- 19 from Laboratório de Psicologia
- 1 from Análise Psicológica
- 2 from Revista Portuguesa de Psicologia
- 230 from Scopus
- 119 from Web of Science

References excluded:
- 197 were repeated (34 from LP; 56 from AP; 44 from Scopus; 63 from WoS)
- 5285 were not norming studies / databases of words (61 from LP; 185 from AP; 113 from RPP; 3289 from Scopus; 1637 from WoS)

Other included references:
- 3 studies in which the authors were involved

References excluded:
- 8 were repeated (7 from Scopus; 7 from WoS)
- 26 were not norming studies / databases of words (24 from Scopus; 2 from WoS)
- 84 where words were not the basic unit of analysis (e.g., recorded speech, texts, sentences, images, sounds) (2 from LP; 47 from Scopus; 35 from WoS)
- 188 were not databases of EP words (114 from Scopus; 74 from WoS)
- 43 did not included lexicosemantic / affective norming data (3 from LP; 1 from AP; 32 from Scopus; 7 from WoS)

Figure 1. Flow diagram of the search methodology and studies selection
Notes. AP – Análise Psicológica; LP – Laboratório de Psicologia; EP – European Portuguese; RPP – Revista Portuguesa de Psicologia; WoS – Web of Science
The results of the present research are summarized in Tables 1 and 2 (see also Appendixes 2 and 3 for more details), organized by alphabetical order of the first author’s surname. We found 25 studies that met our inclusion criteria. Of those, 18 refer to norming studies on lexicosemantic and affective characteristics and seven on free association norms for EP words. These databases include different categories of words, such as nouns (in most studies), adjectives, verbs, and / or adverbs. All the considered databases were accompanied by supplemental materials and / or appendixes containing the norming information and are freely available.

Table 1
Summary of studies reporting data on lexicosemantic and / or affective variables for European Portuguese words

| Citation [Database name] | N (Words) | N (Subjects) | Variables measured |
|--------------------------|-----------|--------------|--------------------|
| Cameirão & Vicente (2010) | 1749 | 685 undergraduate students | Age of acquisition |
| Félix et al. (2019) | 170 | 40 undergraduate students | Familiarity |
| Félix et al. (2020) | 224 | 248 adults and young adults | Animacy |
| Garcia-Marques (2003) | 429 | 256 undergraduate students | Emotional valence |
| Garrido & Prada (2018) | 640 | 230 students | Emotional valence |
| Garrido et al. (2011) | 336 | 230 students | Emotional valence |
| Garrido et al. (2010) | 123 | 54 students | Emotional valence |
| Gaspar (2009) | 270 | 183 undergraduate students | Emotional valence |
| Jerónimo (2003) | 284 | 140 students | Subjective frequency of written words |
| Leitão et al. (2010) | 252 | 214 students | Age of acquisition |
| Marques (2004) | 459 | 79 + 34 undergraduate students | Familiarity – word’s meaning |
| Marques (2005) | 250 | 103 undergraduate students | Imagery |
| Marques et al. (2007) | 834 | 110 undergraduate students | Age of acquisition |
| Pimentel & Albuquerque (2014) | 12 | 90 students | Concreteness |
| Prada & Silva (2008) | 400 | 173 students | Emotional / Affective valence |
| Santi et al. (2015) | 280 | 110 students | Domain typicality |
| Soares et al. (2012) [ANEW] | 1034 | 958 under- and graduate students | Arousal |
| Soares et al. (2017) [MWP – Minho Word Pool] | 3800 | 2357 undergraduate students | Imageability |

Notes. aCameirão and Vicente (2010) report presenting AoA ratings for 1749 words, although we found that 31 of those words appear twice; bGarrido and Prada (2018) present norming data for 320 EP words and 320 English words. See Appendixes 2 and 4 for detailed information on each study.
Table 2

Summary of the studies regarding the free association norms for European Portuguese words

| Citation                     | N (Words) | N (Subjects) | Variables measured                     |
|------------------------------|-----------|--------------|----------------------------------------|
| Carneiro et al. (2004)       | 16        | 300 children; 100 undergraduate students | SS First associate RSA IDIO            |
| Carneiro et al. (2011)       | 790 (79 lists of 10 words each) | 526 undergraduate students | Backward associative strength SS RSA IDIO Non-responses |
| Comesaña et al. (2014)       | 139       | 325 children | SS First associate RSA IDIO Non-responses Distance between the first and the second associate |
| Félix et al. (2019)          | 100       | 70 undergraduate students | SS First associate RSA IDIO |
| Marques (2002a)              | 278       | 129 undergraduate students | SS First associate RSA IDIO Non-responses |
| Marques et al. (2013a)       | 200       | 106 undergraduate students | SS First associate RSA IDIO Non-responses |
| Valchev et al. (2005)        | 38        | 91 undergraduate students | SS First associate RSA |

Notes. IDIO=Idiosyncratic responses; RSA=Relative Strength of Association; SS=Set size. See Appendixes 3 and 5 for more detailed information about these studies.

The searched databases comprise, on average, 523.08 words (SD=780.45; Range: 12 – 3800). The variables covered by these databases, along with the definitions used in each study, are provided in Appendixes 4 and 5. The mean sample size was of 317.64 participants (SD=475.45; Range: 40 – 2357). Twenty-two studies used samples only of university students, one also included non-university adults (Félix et al., 2020), another also included children (Carneiro et al., 2004), and one collected data only from children (Comesaña et al., 2014).

We also created a database containing all the scores reported in the studies, comprising a total of 5346 words. This database is available in our Open Science Framework project (https://osf.io/9ta3y/). In some of the referenced works, the authors provided their collected information along with information on other variables that was extracted from other studies. For example, Cameirão and Vicente (2010) collected new data on age of acquisition but also presented data on the variables of familiarity, imageability, concreteness, frequency, grammatical class, length, orthographic and phonological neighbors that were retrieved from other studies. In our database we only present the new information provided by each study.

We start by describing the data gathered from the 18 norming studies on lexicosemantic and affective variables. For most variables, words that are included provide assessments that range from the lower to the upper values of the rating scales. Also, 11.3% of the words have data

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2 Words in our database are spelled according to the latest Portuguese spelling agreement (Acordo Ortográfico). For this reason, some of the words will differ between our database and their original database, although they correspond to the same word (e.g., arquitecto vs. arquiteto).
available for only one variable and each word was rated in just one study. For most of the words (87.5%), norming data for two or more variables is available (1.2% of the words contain information only of free-association norms or typicality). Within this last group, 89.9% of words (representing 78.7% of the total words from the overall database here presented) contain data collected from different studies; however, for roughly a quarter of those words (22.9%; 20.1% of the total words), data on the same variable were collected in various studies\(^3\). These results not only reveal that most of the ever-rated EP words are characterized on different lexicosemantic and / or affective variables, but also that these data are repeated (or “duplicated”) among studies.

Most norming studies conducted in Portugal collected data on familiarity (nine studies\(^4\)) and on emotional valence (eight studies). However, as the norming studies on familiarity considered a relatively small number of words, we only have information on this variable for about 27.7%\(^5\) of all words; differently, about 41.8% of all words have been rated for emotional valence. Information on concreteness, subjective frequency and imageability is available for about 73.0% of all the rated words; these are the variables best represented in the presented database, largely due to the high number of words rated in Soares and collaborators’ work (2017).

In order to explore communalities in the ratings obtained for the same word and variable between / among studies, we calculated Pearson correlations; these are presented in Appendix 6. Some of the obtained correlations included a small number of items; we opted to present only the correlations that included at least 15 data points (Bonett & Wright, 2000) which provide more reliable information.

High and significant correlations between ratings of the same variable were obtained across studies (.707<|r|<.996). For example, the correlations among the three studies providing concreteness ratings varied between .938 and .968, and for AoA between .884 and .943. One exception can be found for the variable of familiarity (.032<|r|<.957) where the disparate results were mostly due to the adoption of different scales and concepts across studies\(^6\). Overall, the results revealed consistency on the normative data collected over the last 20 years in different studies.

An inspection of the relations between variables that have been described in the literature provides another form of validation of the presented data. Although an in-depth consideration of these relations is out of the scope of this work, we describe a few potentially interesting results. Statistically significant moderate to high correlations were obtained between concreteness and imageability ratings (.680<|r|<.960), as expected according to Paivio and coworkers (1968). The values for familiarity and subjective frequency were also moderately correlated (average of the absolute values of the various correlations=.627) in agreement with the results obtained by Balota et al. (2001). Significant moderate and negative correlations were found between AoA and

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\(^3\) The familiarity data from Marques (2004) and the typicality data from Santi et al. (2015) were not included in this analysis. In case they were included, the proportion of “repeated” norming data here reported would become inflated, as these studies report different norming data for a single variable (familiarity with the referent and the meaning, and superordinate and domain typicality, respectively). If those studies were included, 10.9% of words would contain norming data on just one experiential variable, while 87.9% would contain data on two or more variables (the remaining 1.2% of the words contain only data on free association norms); from the last group, 28.4% of the words would have data on a given variable from different studies.

\(^4\) Data on familiarity from Santi et al. (2015) are not available.

\(^5\) If the familiarity ratings obtained from Marques (2004) were also considered, then 33.5% of the overall words included in the present database would contain familiarity norming scores.

\(^6\) Negative and low correlations were obtained between the variable familiarity with the meaning from Marques (2004) and other familiarity values (-.540<|r|<.957). These results might be due (at least partially) to the inverse rating scale used in that study (see Appendixes 2, 4 and 6), although the high correlation absolute values suggest that the familiarity concept used across studies might be tapping into a similar feature.
imageability (\(-.859 < r < -.572\)), a relation that has been reported in the literature (Brown, 1957). In
sum, the confirmation of these relations suggests that one can reliably use the present data.

Regarding the free association indexes, Appendix 7 reports the correlations obtained among
studies. Again, only correlations that included a minimum of 15 datapoints are reported. The
idiosyncratic responses index varied between studies, revealing the heterogeneity among people
when generating a single associate. Not surprisingly, moderate negative and significant correlations
\((-0.420 < r < -0.779)\) were obtained between the relative strength of association (of the first associate)
and set size; this is because RSA is a quotient containing SS in the denominator (thus, the higher
the SS, the lower RSA is).

Discussion

This study provides an overview of the norming studies of EP words published in the last 20
years. These include both lexicosemantic and affective norming data of words (e.g., familiarity,
animacy and arousal) as well as free association norms of words. We also provide a brief definition
of the variables for which data are presented along with information on the corresponding studies.

Our search revealed the existence of 25 norming studies that, on average, provide information
for a reasonable number of words. The obtained results not only reveal that information on several
experiential variables is available for most of the EP rated words, but also that data are frequently
spread across different databases (68.1% of times). This dispersal of information comes as at a
cost to researchers who have to spend more time searching for databases and aggregating dispersed
information. In addition, data collected on the same variable are sometimes (for 20.2% of the
words) repeated or duplicated, as they were collected in different studies. Although replication
studies are needed (e.g., to update the norming data of a language in permanent change; Comesaña
et al., 2014), it might also correspond to an unnecessary duplication of work and a waste of
researchers’ time and resources in collecting data that are already available; the high correlation
values here reported among the data obtained for the same variable in different studies (at least
for some of the variables) support this idea. For all these reasons, the aim of presenting a single
database that brings together the norming data for European Portuguese words made available in
the last 20 years, is more than justified.

Although these norming studies cover a variety of dimensions, other word variables of potential
interest can be found in the literature that still lack research in our language. Some examples of
that are: goodness, meaningfulness (Rubin & Friendly, 1986), pleasantness (Clark & Paivio, 2004),
gender association / ladenness (Scott et al., 2019), number of senses / meanings (Miller, 1995),
sensory experience (Juhasz & Yap, 2013), and body-object interaction (Pexman et al., 2019). For
more information on these variables, see the cited studies.

Regarding the available data here reported, some disparity seems to exist in the way some of
the variables were defined and how they were measured; this somehow mimics the state of the
international literature. For example, there are various operationalizations of subjective frequency
and different conceptions on how it differs from familiarity. In some studies, these two terms are
used interchangeably (e.g., Garcia-Marques, 2003; Jerónimo, 2003). However, the instructions
given to the participants direct them to a familiarity or a subjective frequency judgement. Although
familiarity and subjective frequency are related variables (see Appendix 6), Balota et al. (2001)
argue that subjective frequency may be a better estimate of the subjective exposure to a word than
familiarity; this relates to the fact that some of the instructions used to assess familiarity seem to
be vague, allowing participants to support their familiarity ratings on other variables or aspects.

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Two other concepts that have raised debate are those of pleasantness and emotional valence. Although they have been used, to some extent, indiscriminately in the literature (Whissell, 2008), they might appeal to different meanings. According to Scott and colleagues (2019) emotional valence corresponds to a measure of value where items rated as more positive are thought to be good, whereas those rated more negatively are considered to be bad. On the other hand, pleasantness seems to refer more to the feelings of the rater regarding the word’s connotation (Gelin et al., 2017). More recently, based on a set of factorial analysis, Brysbaert and coworkers (2019), have argued that pleasantness and emotional valence seem to belong to the same factor, under a larger umbrella called valence. In our search we found a set of studies reporting both emotional valence and a broader measure of emotionality.

As denoted in Appendixes 2 and 4, across studies that report information on a given variable, different conceptions and operationalization of that variable, as well as methods and scales have been used. We caution the reader to take these elements into consideration.

We should also note that we only report the studies obtained from our literature search strategy which misses unpublished studies (e.g., data reported in Master or PhD unpublished thesis) and studies published prior to year 2000. For example, there is an unpublished study on free association norms by Albuquerque (2010) that is frequently referenced in publications that have used it (this study is available upon request to the author). In that work, a total of 1264 students provided free association norms for a set of 489 words (including nouns and adjectives). In that study, participants were asked to write down the first word that came to their minds when presented with the cue-word.

The EP studies on free association norms of words contain a low number of words each, as compared to studies such as the South Florida Free Association Norms (Nelson et al., 1998). Although free association research has slowed down through the years, it remains an interesting field of research, as it is considered by many to be a way of accessing semantic memory. As words are versatile stimuli, used in several research domains (e.g., neuropsychology, social perception), it is important to control for the semantic relatedness of words when selecting them for research experiments, as it can bias some results (e.g., memory recall; Buchanan et al., 2006).

We should also acknowledge the existence of other EP word databases that cover word variables that were not of interest to the present work or that did not show up in our search. Examples are the PORLEX (Gomes & Castro, 2003), P-PAL (Soares, Iriarte, et al., 2014), SUBTLEX (Soares et al., 2015), ESCOLEX (Soares, Medeiros, et al., 2014), the corpora from the Centro de Linguística da Universidade de Lisboa (CLUL, 2019) – including CORLEX (Nascimento, 2003) –, or the Corpus do Português (Davies, 2012). Studies containing norming data for stimuli other than written words were also excluded from our review. Thus, for example, we did not include the Domingos and Garcia-Marques’s study (2008) which provided norming data for nonwords, or the Soares and colleagues’ work (2013) with norming data for sounds.

It is interesting to note that the studies reported in the present work collected their normative data mostly with young adults. Only a couple of studies on free association norms included younger samples. While this is understandable, as most research that will benefit from these norms will most likely be conducted with these age groups, the growing interest in other age groups (namely older adults) could lead to the development of normative studies with those specific groups. While one might think that the assessment of some word variables could be relatively stable across the life span, others could vary. For example, the words acácia [acacia], traineira [trawler], or alpendre [porch] which were rated as not very familiar by the young adults would probably be more familiar to older adults (Garcia-Marques, 2003; Marques, 2004). Also, Duarte et al. (2007) reported a significant interaction between age (young vs. older adults) and animacy (animate vs. inanimate words) in a familiarity rating task. Post-hoc analysis revealed that animates received significantly higher scores of familiarity than inanimates only in the older adults group; for the younger adults groups, the difference was non-significant. There are also age differences
reported in the literature on other variables. For example, older people seem to rate negative stimuli as more arousing than young participants; on the other hand, they seem to rate positive stimuli as less arousing than young people (Fairfield et al., 2017).

Finally, with this study, we make available a database that congregates the information from the various Portuguese norming studies on the word variables here considered. We hope this resource will be of use to other researchers needing to select stimuli for their studies.

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Appendix 1

Search method

| Source | Keywords | Results | Included |
|--------|----------|---------|----------|
| Laboratório de Psicologia | familiaridade; familiarity AND word; frequência; frequency; valência; valence; valência emocional; emotional valence; valência mental; mental valence; ativação; arousal; dominância; dominance; idade de aquisição; age of acquisition; concreteness; imageability; imagética; imagery; disponibilidade; availability; animacidade; animacy; tipicidade; (concept) typicality; diversidade de contexto; diversidade contextual; palavra; word; português; Portuguese; língua portuguesa; portuguesa; European Portuguese; base de palavras; word database; estudo normativo; norming study; normas | 114 | 14 |
| Análise Psicológica | Idem | 242 | 0 |
| Revista Portuguesa de Psicologia | Idem (FILTER: RANGE: 2000-2019 – last year of publications available) | 115 | 2 |
| Scopus | familiaridade; familiarity AND word AND portuguese; frequência; frequency AND word AND portuguese; valência; valence; valência emocional; emotional valence; mental valence; arousal; dominância; dominance; idade de aquisição; age of acquisition; concreteness; imageability; imagética; imagery; disponibilidade; availability; animacidade; animacy; tipicidade; (concept) typicality; diversidade de contexto; diversidade contextual; palavra; word; português; Portuguese; língua portuguesa; portuguesa; European Portuguese; base de palavras; word database; estudo normativo; norming study; normas | 3563 | 6 |
| Web of Science | Idem (FILTER: Topic – Article title, abstract, keywords and Keywords Plus; RANGE: 2000-2020) | 1819 | 0 |
| Authors | – | – | 3 |

Note: The key words separated by ‘;’ represent a new search.

Appendix 2

Extended information of studies reporting data on lexicosemantic and/or affective variables for European Portuguese words

| Citation | [Database name] (Words) of words (Subjects) per word | Variables | Measurement scales | Comments / Observations | Data availability |
|----------|------------------------------------------------------|-----------|--------------------|-------------------------|------------------|
| Camerino & Vicente (2010)[a] | 1008 nouns, 373 verbs, 332 adjectives, 36 adverbs (Males=21%) | Age of acquisition; Familiarity; Imageability; Concreteness; Frequency; Grammatical class; Length Orthographic neighbors; Phonological neighbors | 9-point scale | – 106 words in common with Marques et al. (2007); r= 944 | doi: 10.3758/BRM.42.2.47 |
| Félix et al (2019) [Study 1] | 137 nouns, 31 adjectives, 2 verbs (Males=40%) | Familiarity; Concreteness | 7-point scale | – | Data available by request to the corresponding author: [sara.felix@ua.pt] |
### Appendix 2 (cont.)

| Citation                  | N (Words) | Type of words         | N (Subjects) | N (ratings per word) | Participants' age: M (Age range or SD) | Variables                                                                 | Measurement scales                          | Comments / Observations                                      | Data availability                  |
|---------------------------|-----------|-----------------------|--------------|----------------------|----------------------------------------|---------------------------------------------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------|----------------------------------|
| Félix et al. (2020)       | 224       | Concrete nouns        | 248 adults   | 12.5                 | 33.3 (14.1)                           | - Animacy                                                                 | 7-point scale                              | - Words retrieved from Cameirão and Vicente (2010), Marques et al. (2007), and Soares et al. (2012, 2017) | Available at http://evo.psych.purdue.edu/data/ and in the appendix of the article |
| García-Marques (2003)     | 429       | 213 concrete nouns, 216 abstract nouns and adjectives | 256 undergraduate students | 32 ratings (per word, for each variable) | *                             | - Emotional valence, - Familiarity (Data extracted from other studies regarding concreteness - concrete and abstract words - are also included) | 7-point scales                             | - Words are divided into two categories: concrete and abstract words; however, there was no data collection on the concreteness dimension | Table 1 of the article |
| Garrido & Prada (2018)    | 640       | 380 nouns and 260 adjectives (320 EP and 320 English words) | 230 students | 26-32 | 23.5 (6.9) | - Emotional valence, - Emotional intensity, - Familiarity | 7-point scales                             | - Participants were bilinguals: EP native speakers, also fluent in English (self-reported) | Authors’ OSF Project (https://osf.io/jzy42/) |
| Garrido et al. (2011)     | 336       | 282 nouns, 28 adjectives, 16 verbs, and 10 words that can be both nouns and adjectives | 230 students | <30 ratings (per word, for each variable) | 24.8 (7.5; range: 17-63) | - Emotional valence, - Spatial content | 7-point scales                             | -                                                                 | Tables 1 to 4 of the article |
| Garrido et al. (2010)     | 123       | 117 nouns, 2 adjectives, and 4 words that can be both nouns and adjectives | 54 students | Mvalence=51.8 (range: 49-53); Mvalence=42.4 (range: 39-44) | 24.2 (6.7) | - Emotional valence, - Political connotation (left-wing / right-wing) | 7-point scales                             | - Words related with politics                                                                 | Tables 1 to 3 of the article |
| Gaspar (2009)             | 270       | 277 nouns, 38 adjectives, and 5 words that can be both nouns and adjectives | 183 undergraduate students | Mvalence=84.5 (range: 80-89 ratings); MFamiliarity=82.0 (range: 79-85) | 19.7 (1.9) | - Emotional valence, - Familiarity | 7-point scales                             | - Words extracted from PORLEX (Gomes, 2001; Gomes & Castro, 2003)                                                                 | Tables 1 to 2 of the article |
| Citation [Database name] | N (Words) | Type of words | N (Subjects) | N (ratings age: M (Age range or SD)) | Variables | Measurement scales | Comments / Observations | Data availability |
|--------------------------|-----------|---------------|--------------|-------------------------------------|-----------|--------------------|------------------------|-------------------|
| Jerónimo (2003)          | 284       | Adjectives (almost all) | 140 students | N/A (the article each word was rated by 70 participants) | *         | – Subjective frequency of written words – Synonymy | 7-point scales 1=never encountered this word in my life / these two words have completely different meanings; 7=encountered this word several times a day / these two words have exactly the same meaning | – Words related to four personality traits – 111 words extracted from Garrido's (2001) and Jerónimo's (2001) Master thesis, as cited in Jerónimo (2003) | Appendix of the article |
| Leitão et al. (2010)     | 252       | Nouns Words from different categories: Living (32 animals, 22 fruits, 28 vegetables); Non-living (24 instruments, 20 transports, 26 clothes, 16 other); 26 Human agents/Jobs; 33 Events; 25 States or Psychological attributes | (range: 35-37) | 24.4 – Age of acquisition Familiarity and Imagability (Data extracted from other studies regarding the following variables are also included: Frequency, Length (long/short word)) | – Age of acquisition: Frequency and Imagability: 7-point scales 1=very frequent use of the word / high imagability; 7=very frequent use of the word / low imagability; 1=never used the word / low familiarity | – Frequency data extracted from CORLEX (Nascimento, 2003) – Correlation with Marques's (2004, 2005; Marques et al., 2007) data | Appendix of the article |
| Marques (2004)           | 459       | 320 concrete nouns (rated by the 1st sample) and 139 concrete and abstract nouns (plus 80 words already rated by the 1st sample) | N/A | 1st sample: M=18.3; 2nd sample: M=18.6 | – Familiarity (regarding the word's meaning and referent) (Note: Not all words were rated in both these measures) | 5-point scale 1=very familiar 5=not familiar | – Inverse scale (higher scores reveal lower familiarity rates) – Familiarity ratings regarding the word's meaning and referent (Lamarche & Saumier, 1993) | Appendix of the article |
| Citation [Database name] | N (Words) | Type of words | N (Subjects) | N (ratings per word) | Participants’ age: M (Age range or SD) | Variables | Measurement scales | Comments / Observations | Data availability |
|--------------------------|-----------|---------------|--------------|----------------------|----------------------------------------|-----------|-------------------|------------------------|-------------------|
| Marques (2005)           | 250       | Nouns         | 103 graduate students (Males=19%) | N/A (the article implies that each word received imagery and concreteness ratings by 53 and 50 participants, respectively) | 19.2 | Imagery: 7-point scales | 1=high abstractness / low imageability; 7=high concreteness / high imageability | – | Appendix of the article |
| Marques et al. (2007)    | 834       | Nouns         | 110 graduate students (Males=13%) | M=22 (range: 21-23) | 18.5 (range: 17-26) | Age of acquisition: 7-point scale | Words selected from Marques (1997, 2004) – Correlation with AoA obtained in foreign studies | doi: 10.3758/BF03193013 |
| Pimentel & Albuquerque (2014) | 12       | Nouns         | 90 students (almost all) (Males=27%) | N/A (the article implies that all participants provided ratings of all variables for all words) | 21.9 (4.7; range: 18-38) | Concreteness: 7-point scales | 1=high abstractness / low imageability; 7=high concreteness / high imageability | – | Tables 1 to 3 of the article |
| Prada & Silva (2008)     | 400       | Adjectives    | 173 students (Males=17%) | N/A | 28.9 (3.9; range: 17-51) | Emotional / Affective valence: Familiarity | – | Table 1 of the article |
| Santi et al. (2015) [Study 1] | 280       | Nouns         | 110 students (Males=23%) | N/A | 3 rating groups | Domain typicality: Familiarity: Superordinate typicality | 7-point rating scales | The word “cavalo” [horse] appears twice, in different categories. | Appendix A of the article |
### Appendix 2 (cont.)

| Citation [Database name] | N (Words) | Type of words | N (Subjects) | N (ratings per word) | Participants' age: M (Age range or SD) | Variables | Measurement scales | Comments / Observations | Data availability |
|--------------------------|-----------|---------------|--------------|----------------------|---------------------------------------|-----------|-------------------|----------------------|------------------|
| Soares et al. (2012) [ANEW] | 1034 | Nouns, verbs, adjectives, adverb, interjection | 958 under-graduate and graduate students (Males=65%) | N/A | 22.82 (5.41) | Arousal, Dominance, Emotional valence (Data extracted from other studies regarding the following variables are also included: Frequency and Orthographic neighbors) | 9-point SAM scales | – | doi: 10.3758/s13428-011-0131-7 |
| Soares et al. (2017) [MWP – Minho Word Pool] | 3800 | Nouns, adjectives, adverbs, verbs | 2357 under-graduate students (Males=30%) | M\text{Imageability} =60.8 (range: 35-68); M\text{Concreteness} =57.0 (range: 32-62); M\text{Frequency} =56.7 (range: 42-77) | 22.4 (5.0) | Imageability, Concreteness, Subjective frequency (Data extracted from other studies regarding the following variables are also included: Part of speech / morpho-syntactic information, Objective frequency, Orthographic neighborhood and Orthographic Levenshtein distance) | 7-point scales | – | Words retrieved from P-PAL (Soares, Iriarte et al., 2014) doi: 10.3758/s13428-016-0767-4 |

**Notes.** M=Mean; n=Number of participants in each rating group; N=Number of … (words, subjects, ratings per word); N/A=Not available; SD=Standard Deviation. aCameirão and Vicente (2010) report presenting AoA ratings for 1749 words, although we found that 31 of those words appear twice. *The authors did not specify the age of their participants. However, in all of the cases, participants were described as being university students.*

### Appendix 3

**Extended information of the studies reporting free association norms for European Portuguese words**

| Citation | N (Words) | N(ratings per word) | Type of words | N (Subjects) | Participants' age: M (Age range or SD) | Variables measured | Instructions | Comments | Data availability |
|----------|-----------|----------------------|---------------|--------------|---------------------------------------|-------------------|-------------|----------|------------------|
| Carneiro et al. (2004) | 16 | N/A | Nouns | 300 children; 100 in each age group (Males=43%); 100 under-graduate students (M=48%) | 3-4 YO (M=3.5, SD=0.5); 7.8 YO (M=7.5, SD=0.5); 11-12 YO (M=11.6, SD=0.5); Undergraduates (M=24; range: 18-38) | – | Set size, First associate, RSA, IDO | Say, or write, 3 words related with the presented cue-word | Appendix of the article |
### Appendix 3 (cont.)

| Citation                  | Citation (2013) | N (Words) (Range: Nouns (almost all) 129 undergraduate students (Males=15%)) | N (ratings per word) | Type of words | N (Subjects) | Participants’ age: M (Age range or SD) | Variables measured | Instructions | Comments | Data availability |
|---------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|--------------|--------------------------------------|---------------------|--------------|----------|------------------|
| Carneiro et al. (2011)    |                 | 790 (79 lists of words, of 10 words each)                                                                                         |                      | Nouns and adjectives | 52.6 undergraduate students (Males=15%) | 26.0                                                                                                  | Backward associative strength | The 79 lists of words were presented and participants were asked to retrieve the critical item (backward association) | Words retrieved from Albuquerque (2010) | Table 1 of the article |
| Comesaña et al. (2014)    |                 | 139 N/A                                                                                                                             |                      | Nouns (almost all; some can also be adjectives) | 32.5 children (Males=48%)               | 3 age-groups of participants: 7-8 YO (M=8.1; SD=0.3); 9-10 YO (M=10.2; SD=0.4); 11-12 YO (M=12.0; SD=0.1) | Set size: – First associate RSA – IDIO – Non-responses – Distance between the first and the second associate | After reading the cue-word, participants wrote the first word that came to their minds | – | doi: 10.3758/s13428-013-0388-0 |
| Félix et al. (2019) [Study 2] |                 | 100 $\bar{M}$=6.8.2 (range: 63.70)                                                                                               |                      | Nouns and adjectives | 70 undergraduate students (Males=50%) | 21.0 (2.2)                                                                                                  | Set size: – First associate RSA – IDIO | After reading the cue-word, participants wrote the first word that came to their minds, related to the cue-word | – | Data available by request to the corresponding author: sara.felix@ua.pt |
| Marques (2002a)           |                 | 278 (Range: 120-125)                                                                                                                |                      | Nouns (almost all) | 129 undergraduate students (Males=15%) | 18.0                                                                                                  | Set size: – First associate RSA – IDIO – Non-responses | After reading the cue-word, participants wrote the first word that came to their minds | – | (Marques, 2002b) |
| Marques et al. (2013a)    |                 | 200 N/A                                                                                                                             |                      | Nouns (almost all) | 106 undergraduate students (Males=15%) | 19.5                                                                                                  | Set size: – First associate RSA – IDIO – Non-responses | After reading the cue-word, participants wrote the first word that came to their minds | – | (Marques et al., 2013b) |
| Valchev et al. (2005)     |                 | 38 N/A                                                                                                                              |                      | Nouns | 91 undergraduate students | *                                                                                                     | Set size: – First associate RSA | After reading the cue-word, participants wrote the six first words that came to their minds | – | Appendix of the article |

**Notes.** M=Mean, N=Number of, (Words, subjects, ratings per word); N/A=Not available, SD=Standard Deviation, YO=Years old; IDIO=Idiosyncratic responses; RSA=Relative strength of association. *Although the author describes having collected data for 302 words, we only find information for 278 on the corresponding available datafile. The author did not specify the age of the participants but described them as being university students.
### Appendix 4

**Definitions of the lexicosemantic and affective variables found and databases that report related data**

| Variable                  | Description                                                                 | Databases citation                                                                 |
|---------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| **Age of acquisition (AoA)** | Can be broadly defined as the "age at which words are acquired" or learnt (Marques et al., 2007, p. 439). This definition is valid even if one could not use, write or read the word at the indicated age (Leitão et al., 2010). Although different AoA assessment scales were used across studies, they all adopted this definition. Only two studies allowed participants to state that they did not know the word (Leitão et al., 2010; Marques et al., 2007). To date, all Portuguese studies have presented subjective AoA ratings, that is, adult estimates of the age of acquisition of words. Only two studies allowed participants to state that they did not know the word (Leitão et al., 2010; Marques et al., 2007). To date, all Portuguese studies have presented subjective AoA ratings, that is, adult estimates of the age of acquisition of words. | – Camerio & Vicente (2010); – Leitão et al. (2010); – Marques et al. (2007) |
| **Animacy**               | Animacy refers to the characteristic of a living being. All things can be rated between being totally living (animate) and totally nonliving (inanimate) entities (Félix et al., 2020, Name et al., 2013). Some words are ambiguous in terms of animacy (e.g., plants and body parts). | – Félix et al. (2020)                                                                |
| **Arousal**               | “The degree of excitement or activation a subject can feel towards a given stimulus, varying from calm to exciting” (Soares et al., 2012, p. 257). | – Soares et al. (2012)                                                              |
| **Concreteness**          | “The degree to which words refer to objects, persons, places, or things that can be experienced by the senses” (Soares et al., 2017, p. 1066). Such variable varies from low concreteness (or high abstractness) to high concreteness. All studies adopted this definition of concreteness. | – Félix et al. (2019); – Marques (2005); – Pimentel & Albuquerque (2014); – Soares et al. (2017) |
| **Dominance**             | “The degree of control a subject feels over a specific stimulus, varying from in control to out of control” (Soares et al., 2012, p. 257). | – Soares et al. (2012)                                                              |
| **Emotional intensity (Emotionality)** | Is defined as the emotional content conveyed by a stimulus, varying from not very intense to very intense. Emotional intensity differs from emotional valence. For example, two words may share a high emotional intensity level while being of opposite valence (e.g., love and death, Garrido & Prada, 2018). | – Garrido & Pada (2018)                                                             |
| **Emotional valence**     | Refers to the subjective emotional or affective ratings towards a word. Garrido and Prada (2018), and Gaspar (2009) focus on the participants’ feelings towards a specific word; however, whereas the scale used by Garrido and Prada ranged from very negative to very positive, the one used by Gaspar varied from very unpleasant to very pleasant. Also, in Source and coworkers (2012), participants’ assessments of the words varied from unpleasant to pleasant. Other authors define emotional valence as the subjective rating of how positive or negative a word’s meaning may be (Garcia-Marques, 2003; Garrido et al., 2010, 2011, Pimentel & Albuquerque, 2014, Prada & Silva, 2008). | – Garcia-Marques (2003); – Garrido & Pada (2011, 2010); – Gaspar (2009); – Pimentel & Albuquerque (2014); – Prada & Silva (2008); – Soares et al. (2012) |
| **Familiarity**           | Familiarity is an estimation of how frequently a person meets a specific word in reading, speaking and listening, varying from not very familiar to very familiar. A word is considered familiar if one knows its meaning. In Marques (2004), two measures of familiarity were used: one regarding the word’s meaning and the other regarding its referent (as proposed by Larochelle & Sasmier, 1993). | – Félix et al. (2019); – Garcia-Marques (2003); – Garrido & Pada (2018); – Gaspar (2009); – Leitão et al. (2010); – Marques (2004); – Pimentel & Albuquerque (2014); – Prada & Silva (2008); – Santi et al. (2015) |
| **Imageability**          | Can be defined as “the ease and speed with which a word evokes a mental image” (Soares et al., 2017, p. 1066), a mental sound (Leitão et al., 2010), or other mental representation of a sensorial experience (Marques, 2005). Words can be rated between low to high imageability. | – Leitão et al. (2010); – Marques (2005); – Soares et al. (2017) |
| **Political connotation** | Consists in the word classification in terms of its political connotation, ranging from the left–to the right-wing (Garrido et al., 2010). | – Garrido et al. (2010)                                                             |
| **Spatial content**       | Refers to the spatial representation of a word, ranging from down to up. For example, the word basement would receive a rating of down, while attic would be rated more as up. Also, some mood expressions (e.g., feeling down) seem to possess spatial content, which relates this variable with emotional valence (Garrido et al., 2011). | – Garrido et al. (2011)                                                             |
| **Subjective frequency**  | This variable reflects a subjective estimation of how frequently how many times in a given period of time) individuals meet a word in its written form (Jerónimo, 2003), or written and spoken form (Soares et al., 2017). The latter authors also define subjective frequency as “the degree to which individuals know and use words in their everyday life”, ranging from words never encountered before, to words encountered several times a day (p. 1070). | – Jerónimo (2003); – Soares et al. (2017)                                           |
| **Synonymy**              | This variable assesses to what extent two words mean the same. This variable ranges between these two words have exactly the same meaning (Jerónimo, 2003). | – Jerónimo (2003)                                                                  |
Appendix 4 (cont.)

| Variable                              | Description                                                                 | Databases citation |
|---------------------------------------|-----------------------------------------------------------------------------|---------------------|
| Typicality                           | Santi et al. (2015) collected data for superordinate typicality, and domain typicality. Those are defined as how well a word represents a given category (superordinate typicality; examples of categories: birds, music instruments) or a more general domain (examples of domains: living and nonliving things; domain typicality). For example, to represent the category of "birds", an eagle is a better example than a penguin. | – Santi et al. (2015) |

Notes. Objective AoA ratings are obtained through children performance in naming tasks. In Garcia-Maques (2003) words were divided into concrete and abstract words. However, no data were actually collected and/or presented on this dimension. In Marques (2004), participants performed one of two rating tasks: They were presented a list of words, and were asked to rate how familiar they would be with each word (or how easily they would recognize the word) if they were presented with (1) a definition of that word (or its meaning), or (2) a picture of it (that is, its referent). For example, if a word is rated with a low familiarity to the referent value, that means that it is very difficult to identify that word's concept through a picture. Written / Objective frequency measures are also available for EP words. This variable expresses the frequency of a word in a given corpora / database and is usually expressed per million words. Objective frequency is considered a distributional variable; that is why we did not include such variable in this review.

Appendix 5

Description of the variables reported in the studies of free association norms

| Variable                              | Description                                                                 | Databases citation |
|---------------------------------------|-----------------------------------------------------------------------------|---------------------|
| Set size (SS)                         | Number of different associates (words) produced for a single cue-word (Maqres, 2002a; Nelson et al., 2000). | – Carneiro et al. (2004); – Comesaña et al. (2014); – Félix et al. (2019); – Marques (2002a); – Marques et al. (2013a); – Valchev et al. (2005) |
| First associate                       | The associate (target-word) produced by the largest number of participants. | – Carneiro et al. (2004); – Comesaña et al. (2014); – Félix et al. (2019); – Marques (2002a); – Marques et al. (2013a); – Valchev et al. (2005) |
| Relative strength of association (RSA) (or Forward associative strength) | Proportion of participants who produced the same associate for a single cue-word (Marques, 2002a; Nelson et al., 2000). This is a forward measure, that is, assesses the cue-to-target strength (cf. below, the opposite backward associative strength). For example, the RSA for the first associate represents the quotient between the number of participants who produced the first associate and the total responses / associates obtained for a specific cue-word, that is Set size (Nelson et al., 2000). In Félix et al. (2019), RSA was presented as a proportion. The remaining studies presented RSA as a percentage. | – Carneiro et al. (2004); – Comesaña et al. (2014); – Félix et al. (2019); – Marques (2002a); – Marques et al. (2013a); – Valchev et al. (2005) |
| Distance between the first and the second associates | Corresponds to the difference between the RSA of the first and the second associates (Comesaña et al., 2014). | – Comesaña et al. (2014) |
| Backward associative strength (BAS)    | Can be defined as the probability of a target-word to elicit the cue-word. So, this is a measure of the target-to-cue strength. It is calculated by dividing the number of participants who produced the "cue" word (or the critical item) as a response to the presented "target" word, by the total number of responses / targets (Carneiro et al., 2011; Nelson et al., 1998). In Carneiro et al. (2011), BAS was reported as a percentage. | – Carneiro et al. (2011) |
| Idiosyncratic responses (IDIO)         | Number of generated associates with frequency equal to one (Marques, 2002a; Nelson et al., 2000). In Félix et al. (2019), IDIO was presented as an absolute frequency measure. The remaining studies presented IDIO as a percentage. | – Carneiro et al. (2004); – Comesaña et al. (2014); – Félix et al. (2019); – Marques (2002a); – Marques et al. (2013a) |
| Non-responses                         | Percentage of non-responses (e.g., omissions, repetitions of the cue-word, blank responses) (Marques, 2002a). | – Marques (2002a); – Marques et al. (2013a) |

Note. The comparison between idiosyncratic responses and the first associate, for example, allows the understanding of the strength and the nature of the semantic association between the cue and the target (or the generated associate) words (Marques, 2002a).
Appendix 6

Pearson correlation matrix among the scores obtained for the same words across lexicosemantic and affective norming studies

|       | Acqu | Anim | Conc | Dom | Emot | Emot | Fam | Image | Pol | Spat | Syn | Typ | Ref | Ref |
|-------|------|------|------|-----|------|------|-----|-------|-----|------|-----|-----|-----|-----|
|       |      |      |      |     |      |      |     |       |     |      |     |     |     |     |
|       |      |      |      |     |      |      |     |       |     |      |     |     |     |     |
|       |      |      |      |     |      |      |     |       |     |      |     |     |     |     |
|       |      |      |      |     |      |      |     |       |     |      |     |     |     |     |
|       |      |      |      |     |      |      |     |       |     |      |     |     |     |     |

Notes. Acquisition; An=Animacy; Ar=Arousal; C=Concreteness; D=Dominance; EI=Emotional Intensity; EV=Emotional Valence; F=Familiarity; I=Imageability; P=Political Connotation; SC=Spatial Content; SF=Subjective Frequency; S=Synonymy; T=Typicality; (ST)=Superordinate typicality; (AI) / (LN)=Domain typicality: animate-inanimate / living-nonliving; Marques, 2004 (R) / (M)=Familiarity with the referent / meaning; $r$=Pearson Correlation; N=Number of datapoints (words) commonly present in both databases; *Significance level <.05; **Significance level <.01. The empty cells correspond to cases in which the number of words included in the analysis was lower than 15.
**Appendix 7**

*Pearson correlation matrix among the scores obtained for the same words across studies reporting free association norms*

| Set Size       | Relative Strength of Association (1st Associate) | Intrasyntactic Responses | Distance between the 1st and the 2nd Associate | Non-Response | Backwards Association Strength |
|----------------|-----------------------------------------------|--------------------------|-----------------------------------------------|--------------|-----------------------------|
|                | Cameroon (2004) | Cameroon (2014) | Fink (2019) | Marsee (2002) | Mares (2011) | Cameroon (2004) | Cameroon (2014) | Mares (2011) | Cameron (2011) | Cameroon (2014) | Mares (2011) | Cameroon (2011) |
|                |                  |                         |                |                |               |                  |                         |                |               |                  |                |               |
| Cameroon (2004) |                | 1                          | 1                 | .429**     | .260**       | .23               | .036**                 | .21             | .23           | .036**            | .21             | .23           |
| Cameroon (2014) |                | .23                       | 1                 | 1            | .23           | .23               | .23                    | .23             | .23           | .23               | .23             | .23           |
| Mares (2011)   |                | .23                       | .23               | .23           | 1             |                  |                        |                 |               |                   |                 |               |
| Mares (2013)   |                | .23                       | .23               | .23           | .23           | 1             |                        |                 |               |                   |                 |               |
| Fink (2019)    |                | .23                       | .23               | .23           | .23           | .23             | 1                    |                 |               |                   |                 |               |
| Mares (2011)   |                | .23                       | .23               | .23           | .23           | .23             | .23                   | 1               |               |                    |                 |               |
| Cameron (2011) |                | .23                       | .23               | .23           | .23           | .23             | .23                   | .23             | 1             |                    |                 |               |
| Notes.  r=Pearson correlation; N=Number of datapoints (words) commonly presented in both databases; *Significance level <.05; **Significance level <.01 The empty cells correspond to cases in which the number of words in the analysis was lower than 15.
Estudos normativos de características lexicossemânticas e afetivas para palavras do Português Europeu: Uma revisão da literatura

Palavras são estímulos amplamente utilizados em trabalhos sobre a cognição e a linguística. Estes estímulos podem variar em diversos aspectos (e.g., lexicosemânticos e afetivos), passíveis de influenciar o desempenho de múltiplas formas, pelo que é essencial selecioná-los cuidadosamente. No entanto, as bases de dados de palavras do Português Europeu ainda são relativamente escassas, estando difundidas em fontes diversas. Assim, os objetivos deste trabalho foram: (1) fornecer uma revisão das bases de dados contendo dados normativos em termos lexicosemânticos, afetivos e de associação livre para palavras do Português Europeu publicadas desde o ano 2000; (2) resumir as definições destas diferentes variáveis; e (3) combinar, numa única base de dados, os dados normativos disponíveis à data. A nossa revisão de literatura identificou 25 bases de dados, 18 delas contendo dados normativos lexicosemânticos e/ou afetivos, e sete contendo normas de associação livre de palavras. Tais bases de dados incluem palavras de várias categorias (e.g., substantivos e adjetivos), caracterizadas em diferentes variáveis (e.g., familiaridade, imageabilidade, valência emocional, idade de aquisição e animacidade). Esta revisão constitui uma ferramenta útil para investigadores que utilizem recursos relacionados com palavras portuguesas. Apresentamos uma revisão minuciosa das bases de dados, incluindo alguns detalhes sobre cada uma. A base de dados combinada está disponível através do Open Science Framework: https://osf.io/9ta3y/.

Palavras-chave: Estudos normativos para palavras, Variáveis lexicossemânticas, Variáveis afetivas, Associação livre, Português Europeu.

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