How are affective word ratings related to lexico-semantic properties? Evidence from the Sussex Affective Word List (SAWL)

Auxiliary short title: Sussex Affective Word List (SAWL)

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Abstract

Emotional content of verbal material affects the speed of visual word recognition in various cognitive tasks, independently of lexico-semantic variables. However, little is known about how the dimensions of emotional arousal and valence interact with the lexico-semantic properties of words such as age of acquisition (AoA), familiarity and imageability, that determine word recognition performance. This study aimed to examine these relationships using English ratings for affective and lexico-semantic features. Eighty-two native English speakers rated 300 words for emotional valence, arousal, familiarity, AoA and imageability. Although both dimensions of emotion were correlated with lexico-semantic variables, a unique emotion cluster produced the strongest quadratic relationship. This finding suggests that emotion should be included in models of word recognition as it is likely to make an independent contribution.

Introduction

Emotional valence and arousal are generally considered the two dimensions that define the structure of emotion (Feldman Barrett & Russell, 1999; Reisenzein, 1994; Russell, 2003). Valence describes the extent to which an emotion is pleasant or unpleasant (positive, negative), whereas arousal refers to its degree of activation, i.e., how exciting, agitating or otherwise calming an emotion is perceived (Feldman Barrett & Russell, 1999). Despite the utility of these dimensions in affect research (Russell, 2003), there are several unresolved issues. For example, it is not clear whether these dimensions are distinct. Moreover, no consensus has been achieved on the relation between positive and negative affect. For example, it is not known whether these represent distinct aspects or bipolar opposites of the same continuum (Feldman Barrett & Russell, 1999).

The relationship between emotional valence and arousal can be represented by a U-shaped function, whereby emotionally valenced words (positive and negative) are higher in arousal compared to neutral words (Bradley & Lang, 1999; Kanske & Kotz, 2010; Võ et al., 2009). Although arousal is intrinsically associated with valence (Kissler, Herbert, Peyk, & Junghofer, 2007; Scott, O'Donnell, Leuthold, & Sereno, 2009), several models of emotion assume that valence and arousal are distinct variables (Reisenzein, 1994; Russell, 2003). Support for this assumption comes from behavioural and neuroimaging research on emotion word processing (Lewis, Critchley, Rotshtein, & Dolan, 2007). For example, Lewis et al. (2007) reported a double dissociation in brain

activation between emotional valence and arousal during word processing. The amygdala was sensitive to arousal, whereas activation in the orbitofrontal cortex was influenced by emotional valence. Furthermore, different sub-regions of the orbitofrontal cortex were modulated by increasing positive or negative valence, apparently supporting a characterization of valence in terms of independent axes (positive, negative), rather than a bipolar continuum.

Emotional variables have an effect on single word recognition during a variety of cognitive tasks including lexical decision, valence judgement, silent reading, emotional Stroop and self-referential judgement (Estes & Verges, 2008; Kanske & Kotz, 2007; Kissler et al., 2007; Larsen, Mercer, & Balota, 2006; Lewis et al., 2007; Scott et al., 2009; Võ, Jacobs, & Conrad, 2006). Studies employing carefully controlled material generally report a different pattern of processing for emotionally valenced words compared to neutral words: valenced words are responded to faster than neutral words. Nevertheless, other studies found differences between positive and negative words depending on the task at hand, i.e., slower lexical decision latencies but faster valence judgements for negative words compared to positive words (Estes & Verges, 2008); or a general slow-down effect for negative words only when presented in a unique block, but not when intermixed with positive words, suggesting a carry-over effect of negative valence (Algom, Chajut, & Lev, 2004).

The manipulation of single emotion words has been employed in studies investigating emotion processing during text comprehension by

means of short stories describing events and the subsequent emotional reaction of the protagonist. These texts typically consist of a context sentence (or paragraph) and a following target sentence containing an emotion word, which matches or mismatches the context (consistency paradigm, Gernsbacher, Goldsmith, & Robertson, 1992). Texts containing emotional information are processed in a qualitatively different way to texts containing chronological information (Ferstl, Rinck, & von Cramon, 2005): processing of emotional aspects of stories specifically activated the ventromedial prefrontal cortex and the amygdala, whereas processing of chronological aspects involved a bilateral frontoparietal network and the left precuneus

We know that word recognition is influenced by a myriad of lexico-semantic features including word length, frequency, familiarity, age of acquisition (AoA), imageability and concreteness, all of which predict word naming and lexical decision latencies (Balota, Cortese, Sergent-Marshall, Spieler, & Yap, 2004). These variables need to be taken into account and controlled when manipulating affective variables, otherwise their effects on performance might be confounded with lexico-semantic effects, as was the case in many studies using the emotional Stroop task (see Larsen et al., 2006 for a review). The same is true for studies manipulating lexico-semantic features; for example, abstract words seem to have more affective associations compared to concrete words (Kousta, Vigliocco, Vinson, Andrews, & Del Campo, 2011).

Norms for lexico-semantic variables are usually strongly correlated, making it difficult to attribute variability in word recognition to any one

dimension alone (Cutler, 1981): for example, word frequency and age of acquisition are correlated (e.g., Juhasz, 2005), as well as concreteness and imageability (e.g., Paivio, Yuille, & Madigan, 1968). The quadratic (U-shaped) relationship between affective variables suggests that emotion variables may be unitised into a single cluster. It is also possible, however, that each affective variable will be correlated with different lexico-semantic features.

To date, only a few studies have investigated the relationship between affective and non-affective word properties. Scott et al. (2009) found early interactions between word frequency and valence in ERP components, whereby high-frequency valenced words showed larger amplitude in the P1, N1 and EPN components compared to high-frequency neutral words. The same authors, as well as Kuchinke et al. (2007), reported faster lexical decision (LD) latencies for valenced words over neutral ones only for low-frequency words; high-frequency words, instead, showed faster LD latencies for positive stimuli over negative and neutral stimuli. Nakic, Smith, Busis, Vythilingam and Blair (2006) found very low inferior frontal cortex activation for highly frequent negative words, but still significant for highly frequent neutral words, suggesting facilitated processing for the former and thus no need to recruit this region. Overall, these findings suggest that very salient emotional stimuli are prioritised and more easily processed; their salience cannot be attributed to a single variable, but to a combination of variables (high frequency, high arousal and positive valence), where affective dimensions have interactive contributions.

Knowing exactly which variables correlate with arousal and valence would be informative to the question of whether emotion is a distinct cluster, whose effects on performance cannot be simply accounted for by the well-known lexico-semantic predictors.

This question has partly been investigated in previous studies. For example, in order to manipulate the affective and lexico-semantic features of single words, experimenters used large word corpora which include information on features such as length and frequency (CELEX, MPI for Psycholinguistics, 2001), and subjective ratings of word properties from naïve participants on features such as word familiarity, AoA and imageability. Extant databases in English do not include ratings of emotion variables (Bird, Franklin, & Howard, 2001; MRC database, Coltheart, 1981; The Bristol Norms, Stadthagen-Gonzales & Davis, 2006) and corpora with affective ratings do not include ratings of lexico-semantic features (ANEW, Bradley & Lang, 1999). Therefore, nothing is known about the correlations between emotion ratings and lexico-semantic variables. One consequence of this gap is that experimenters must retrieve ratings for the same word from different corpora, which often do not overlap in terms of words sampled and scales used. For example, according to Kousta, Vinson and Vigliocco (2009), rated AoA and imageability for English words are available for only about a third of the words contained in the ANEW database.

The primary aim of the present study was, therefore, to generate a corpus of English words suitable for experiments investigating effects of affective as well as lexico-semantic features on single word recognition

and on text comprehension. To ensure homogeneous evaluations across words and variables, 300 words were rated in a within-subjects design for emotional valence, arousal, familiarity, AoA and imageability. The reliability of the results was tested against extant ratings from other corpora. Imageability was chosen, rather than concreteness, as the former feature has repeatedly been shown to better reflect human picturing activity compared to the latter one, in particular with respect to highly imageable abstract words and emotion words (Altarriba & Bauer, 2004; Paivio et al., 1968).

The corpus includes approximately 100 neutral words to allow comparison between valenced and non-valenced items. A sub-set of words comprised adjectives denoting emotions (e.g., *happy, sad, indifferent*), which are useful for creating texts describing emotional reactions of the protagonists. Possible pairs of antonyms were included for the emotion word subset as well as for other words (i.e., *delighted-disappointed*, *abandon-adopt*; see Appendix B), in order to aid the construction of texts for consistency paradigms (Ferstl et al., 2005; Gernsbacher et al., 1992).

The second aim of the study was to explore whether affective variables are correlated with lexico-semantic ones, or whether they form a distinct cluster. The latter case would confirm that emotion effects cannot be simply accounted for by other word features, but rather they contribute to explain additional variance in performance.

If emotional valence and arousal are distinct dimensions of affect, we should expect to observe differential patterns of correlations

between lexico-semantic features and each of the affective variables. An additional prediction was that positive and negative words would differ in rated levels of arousal, based on previous studies on words (Võ et al., 2009) and pictures (Lang, Bradley, & Cuthbert, 1999). Correlations between word length, familiarity, AoA, frequency and imageability were also expected, in line with previous studies (Bird et al., 2001; Stadthagen-Gonzales & Davis, 2006).

Methods

Participants

Eighty-two students from the University of Sussex (71 women, 11 men) took part in the experiment and received course credits or £7.50. They were all native speakers of English, aged between 18-42 years (M = 20.5, SD = 3.98).

Material

Word selection. Some words were selected from pre-existing emotion word lists: the BAWL (Võ et al., 2006) and the Compass DeRose guide to emotion words (DeRose, 2005). These items were supplemented with additional words, including emotions expressed as adjectives, ranging from very positive (e.g., *delighted*) to very negative (e.g., *terrified*), through neutral (e.g., *apathetic*) as well as pairs of antonyms. These pairs represent simple suggestions; the appropriate selection of antonyms strongly depends on the experimental design and on the discourse context in which they are going to be embedded. A

total of 525 words were initially categorised as positive, negative or neutral by two native English speakers. 300 words were subsequently selected with approximately one third in each category of positive, negative and neutral, by eliminating semantically ambiguous and very infrequent words.

The word corpus. The corpus used in the rating study comprised 300 words, approximately 1/3 positive, 1/3 negative and 1/3 neutral, with 90 adjectives, 118 nouns, 24 verbs, 55 words that can be either verbs or nouns in English, and an additional 13 words belonging to more than 2 categories (see Table 2 for more details). Sixty-one items were classified as concrete and 153 as abstract, according to the definition by Paivio et al. (1968): "concreteness was defined in terms of directness of reference to sense experience" (p. 1). Eighty-six items were emotions or adjectives that can be used to express feelings (e.g., "I am happy", "I feel brave"); we included these categories in the corpus, as this distinction has proven useful in previous research (Altarriba & Bauer, 2004). Frequency of use per million (spoken and written combined) and length in letters, phonemes and syllables were taken from the web-based CELEX database (MPI for Psycholinguistics2001).

The questionnaire. Online questionnaires were created using the software Macromedia Dreamweaver MX 2004. For each feature, a definition for subjective rating was given (see Appendix C), together with instructions including two examples of words at the extremes of a 7-point Likert scale. Definitions of familiarity, AoA and imageability were adapted from the Bristol Norms (Stadthagen-Gonzales & Davis, 2006).

The extremes were labelled as follows: The scale for emotional valence ranged from -3 (very negative) to +3 (very positive); arousal, familiarity and imageability were scaled from 1 (not at all) to 7 (very high), and the AoA scale was labelled using the following age ranges: 0-2, 2-4, 4-6, 6-9, 9-12, 12-16, older than 16. This type of age labels and the use of 7 points represent a standard method for representing AoA (Gilhooly & Loogie, 1980; Morrison, Chappell, & Ellis, 1997). At the right end of each scale the option "unknown word" was given.

Procedure

The participants were given a URL via email to access the questionnaire and enter their details. Then, they read general instructions first, followed by the specific instructions for the first feature to be rated. The words were then presented, each one at the centre of the page immediately followed by the 7-point scale. When all 300 words were rated for one feature, instructions for the next feature rating appeared. In this way, no influence among ratings for different features for the same word was ensured. The order of features and the order of words within each rating task were varied for each participant. Because of their similarity, familiarity and AoA were never adjacent, nor were emotional valence and arousal. The rating task was self-paced and could be completed in one or two sessions within a week. Completion took approximately 1 hour and 15 minutes.

Data Analysis

Overall, less than 0.19% of responses were rated “unknown”. Only four words in the corpus (1.3%) generated “unknown” responses. Means and standard deviations of ratings were calculated for each feature for each word. In addition, a categorical variable “valence category” was created based on the following criteria: words rated from +3 to +1 were categorised as positive, from +0.8 to -0.8 as neutral, and from -1 to -3 as negative. A gap between positive and neutral words, as well as between neutral and negative words was left to reduce ambiguity in categorisation.

Reliability analyses were carried out, correlating the ratings of appropriate subsets of words from the current corpus with ratings from other corpora.

In line with previous literature, plotting valence and arousal ratings revealed a quadratic relationship between these variables (see Figure 1). A quadratic regression with valence as predictor and arousal as outcome variable was conducted: the effects of all other lexico-semantic features were partialled out by entering them as predictors in a first step; valence and valence squared were then entered in a second step.

----------INSERT FIGURE 1 ABOUT HERE----------

Partial correlations between pairs of lexico-semantic features - familiarity, AoA, imageability, log frequency, length in letters, phonemes and syllables - were calculated, by controlling the effects of

the other lexico-semantic variables as well as arousal, valence and valence squared.

Partial correlations between each of the affective variables and each lexico-semantic feature were calculated, by controlling the effects of the remaining variables. Because familiarity and imageability were correlated with valence, as well as with arousal, we decided to also calculate quadratic regressions between valence and each of these variables to explore whether this function more accurately reflects their relationships. All lexico-semantic variables along with arousal were entered in a first step, whereas valence and valence squared were entered in a second step.

Results

The full word list of items and their associated variables, as well as means and standard deviations of all the ratings, are provided in Appendix A.

Descriptive statistics

The descriptive statistics for all features are shown in Table 1 for the three categories defined according to emotional valence. In addition, Table 2 shows the number of words belonging to each grammatical category broken down by valence category.

----------INSERT TABLES 1 & 2 ABOUT HERE----------

Reliability Analyses

The ANEW corpus (Bradley & Lang, 1999) contains valence and arousal ratings for 113 out of the 300 words used in the current study: 47 words were positive, 42 negative and 21 neutral; finally, 3 words were in between valence categories. Pearson correlations between the ANEW ratings and the present ratings were highly significant (Valence: $r = .97$, $p < .001$; Arousal: $r = .73$, $p < .001$).

The MRC Psycholinguistic database (Coltheart, 1981) contains familiarity and imageability ratings for 181, and AoA ratings for 72 words out of the 300 items. Correlations with ratings from MRC database were highly significant (familiarity: $r = .78$, $p < .0001$; imageability: $r = .92$, $p < .0001$; AoA: $r = .93$, $p < .0001$). Finally, in the Bristol Norms (Stadthagen-Gonzales & Davis, 2006) familiarity, imageability and AoA ratings for 53 words were available. Despite the lower number of shared words, correlations were high (familiarity: $r = .91$, $p < .0001$; imageability: $r = .96$, $p < .0001$; AoA: $r = .95$, $p < .0001$).

Relationships among word features

Relationship between affective features. In the quadratic regression predicting arousal from valence ratings, the first model, which included all lexico-semantic variables, accounted for 7% of the variance ($r^2 = .07$, $r = .26$, $F(7,299) = 3.08$, $p = .004$), whereas the second model, which included valence and valence squared, accounted

for an additional 59% (r^2 = .66, r = .81, $F(9,299) = 61.61$, $p < .001$). The regression line including only significant predictors is reported below:

Estimated Arousal = 0.16*Familiarity + 0.16*AoA + 0.09*Imageability – 0.24*Valence + 0.43*Valence^2

A t-test revealed that rated arousal was significantly higher for negative words than positive words ($t(198) = -8.46$, $p < .0001$).

Correlations among lexico-semantic features. All correlations and their significance levels are reported in Table 3. Familiarity showed negative moderate correlations with AoA (r = -.67), positive moderate correlation with imageability (r = .40), an almost moderate positive correlation with log frequency (r = .35) and a low positive correlation with length in phonemes (r = .13). Familiar words are acquired earlier, are more imageable and more frequently used than unfamiliar words. AoA was also moderately negatively correlated with imageability (r = -.57), with early acquired words being highly imageable. Log frequency showed a low positive correlation with length in syllables (r = .12). Finally, length in letters and phonemes were highly positively correlated (r = .70), as well as length in phonemes and syllables (r = .53). No other significant correlations were found.

Relationships between affective and lexico-semantic features. Familiarity showed a highly significant low positive correlation with valence (r = .29) and a significant low positive correlation with arousal (r = .14): positive words and arousing words are more familiar than

negative and non-arousing words, respectively. Imagebility showed positive low correlations with arousal (r = .15) and valence (r = .13), whereby arousing words and positive words are more imageable than non-arousing and negative words, respectively. AoA also showed a low negative correlation with arousal (r = -.13), whereby early acquired words are less arousing. See Table 4 for all correlations and their significance levels.

In the quadratic regression predicting familiarity from valence ratings, all lexico-semantic variables and arousal predicted 62% of the variance in the first step (r^2 = .62, r = .79, $F(7,299) = 67.38$, $p < .001$). Emotional valence only (not valence squared) was an additional significant predictor in the second model, accounting for an additional 4% of the variance (r^2 = .66, r = .81, $F(9,299) = 61.20$, $p < .001$). The regression line is reported here below:

Estimated Familiarity = 6.94 – 0.73*AoA – 0.22*Imageability + 0.10*Phonemes + 0.41*Frequency_log + 0.13*Arousal + 0.13*Valence

A linear function is therefore best suited to represent the relationship between familiarity and valence.

A similar result was obtained when computing the quadratic regression with imageability: the first model predicted 47% of the variance (r^2 = .47, r = .69, $F(7,299) = 37.10$, $p < .001$), whereas emotional valence predicted an additional 1% (r^2 = .48, r = .69, $F(9,299) = 29.96$, $p < .001$):

Estimated Imageability = 11.25 – 0.75*Familiarity – 1.15*AoA + 0.25*Arousal + 0.11*Valence

Given linear correlations of imageability with both valence and arousal, we decided to separately examine them for each valence category. Imageability and arousal were correlated within positive (r = .45, p < .0001) and negative words (r = .60, p < .0001), but not within neutral items (r = -.07, *ns*).

Discussion

As expected, emotional valence and arousal showed a U-shaped relationship after having partialled out the effects of other lexico-semantic features: valenced words (positive and negative) were higher in arousal compared to neutral words. In addition, values for rated arousal were higher for negative than positive words. Affective variables showed partially distinct patterns of correlations with other lexico-semantic variables: familiar words are more positively valenced than unfamiliar words, whereas highly arousing valenced words are more imageable than non-arousing words. Arousing words also seem to have been acquired earlier than non-arousing words.

Our results suggest that, although emotional valence and arousal are related to each other, they must be distinguished carefully in studies manipulating emotion. For example, studies that manipulate valence must control for differences in arousal.

The corpus reported here can be used as a tool for designing psycholinguistic experiments investigating single word processing as well as text comprehension. Other similar corpora comprise only a subset of these features and usually do not contain both affective and

lexico-semantic features rated by the same participants. Furthermore, the present corpus is particularly suitable for text comprehension experiments employing the consistency paradigm (Gernsbacher et al., 1992) because it contains emotion adjectives and pairs of antonyms. Approximately eighty-six words in the form of adjectives refer to emotions or feelings.

We have demonstrated high reliability of the SAWL with other corpora. Ratings for familiarity, AoA and imageability were highly correlated with the ratings from the MRC database and the Bristol Norms. There was little overlap between words in the SAWL and the Bristol Norms; in fact the latter corpus is not rich in emotionally valenced words. In addition, within the words referring to emotions or feelings in the SAWL, only 11 overlapped with the Bristol Norms, whereas 13 emotion adjectives were present in the form of verb or noun in the Bristol Norms. This shows that extant databases are limited in their utility for designing experiments using single words and the SAWL will therefore prove to be a useful resource in the future. In addition, the collection of within-subjects ratings across the same set of words and the same variables provides more homogeneous evaluations and removes the inter-raters variability.

Our ratings for emotional valence and arousal were highly correlated with the ANEW norms, with arousal showing a slightly lower correlation. This might suggest that arousal is a less stable property, more influenced by environmental factors (e.g., mood changes). Alternatively, arousal represents a less well-defined construct compared

to valence; in fact, cross-cultural research has shown that all known languages have words for the pleasant-unpleasant dimension (Wierzbicka, 1999) and that this dimension exists in all cultures (Russell, 1991). Many words referring to emotions or feelings were non-overlapping in the two corpora (approximately half of the emotion adjectives from the SAWL), with some emotions included in the form of nouns or verbs in the ANEW (i.e., *excitement* vs. *excited*; *annoy* vs. *annoyed*) and with some emotions lacking an antonym compared to the SAWL (i.e., *anxious* vs. *anxious-calm*; *lively* vs. *lively-apathetic*; *confident* vs. *confident-unsure*). The SAWL is an advance on the ANEW because a wider range of ratings for affective and lexico-semantic features were taken from the same participants. Nevertheless, a limitation of the SAWL is that it contains less than 1/3 of the number of words in ANEW. Also, the corpus contains a small number of concrete words.

A second aim of the study was to explore possible relationships between affective and lexico-semantic features. Affective variables were strongly related with each other, but they only showed relatively weak correlations with other variables, suggesting that affective features are distinct from lexico-semantic ones and therefore they might contribute to explain additional variance in performance beyond other features. The specific correlations are discussed below.

The correlations found between familiarity and AoA and between familiarity and frequency are in line with previous findings (Bird et al., 2001; Stadthagen-Gonzales & Davis, 2006), suggesting that words that are familiar are also frequently used and are acquired early. Imageability

correlated with AoA, confirming that highly imageable words are acquired earlier than less imageable words (Bird et al., 2001). Finally, moderate-to-high correlations among length measures, as well as low correlations of familiarity and frequency with one length measure, are also in line with previous literature (Bird et al., 2001; Stadthagen-Gonzales & Davis, 2006).

There are no prior reports of a relationship between arousal and imageability. The present results suggest that valenced words with higher levels of arousal more easily evoke a mental image. Arousing stimuli might represent a threat and require immediate action. These stimuli might be associated with intense experiences early in life, by forming a mental image of the event. It is notable that rating the imageability of a word draws on the sensory properties which can be imagined out of context, whereas rated familiarity of words draws on cognitive appraisal, similar to the meta-judgement that is required for assessing emotional valence.

The correlation between emotional valence and familiarity could be accounted for by a response bias instead, with participants being reluctant to admit that they are very familiar with negative words. In support of this claim, we found a moderate partial correlation between familiarity and frequency log (r = .61, p < .001) for positive words (N = 106), by controlling for valence; the same variables showed a low correlation within negative words (r = .29, p < .01). A similar bias was found in a self-referential task (Lewis et al., 2007) in which participants were asked to indicate whether each word could be used to describe

themselves (i.e., “yes/no”) and showed a tendency to respond “yes” more often for positive words.

Positive and negative words differed in levels of rated arousal, with negative words being more arousing, suggesting that positive and negative valences are not just bipolar opposites of a continuum (for consistent evidence see Lang et al., 1999; Võ et al., 2009). We suggest that highly negative words are naturally more arousing than highly positive ones. Negative stimuli can be extremely threatening and need to be quickly avoided or tackled (e.g., Lang, Bradley, & Cuthbert, 1990); therefore heightened physiological changes are tightly associated with them. Positive stimuli are associated with safety and wealth instead (e.g., Higgins, 1997), so very positive stimuli are not necessarily high in arousal (e.g., *friend, paradise*); furthermore, extremely arousing positive stimuli are often associated with risk and might elicit negative feelings beyond a certain threshold (e.g., *rollercoaster, desire*) (Higgins, 1997). An interesting but slightly different idea was proposed by Robinson, Storbeck, Meier and Kirkeby (2004), who suggested that stimuli with positive valence and low arousal elicit approach, whereas stimuli with negative valence and high arousal elicit avoidance.

Nevertheless, there exists the possibility that a sampling bias accounts for the higher arousal level of negative words. Our selection of roughly 1/3 positive, 1/3 negative and 1/3 neutral words does nor necessarily represent the distribution of these categories in natural language.

In sum, the present study showed that affective features are distinct from lexico-semantic features of single words, suggesting that consideration of the latter ones only in order to account for cognitive performance might cover the effects of the emotion factor. In light of these results and of studies showing interaction between valence and frequency (Kuchinke et al., 2007; Nakic et al., 2006; Scott et al., 2009), we suggest that models of word recognition should be integrated with affective features.

Emotional valence and arousal were also shown to be at least in part distinct from each other. In addition, valence appears to be a multifaceted variable and not a continuum (Feldman Barrett & Russell, 1999), raising several questions about the role of affect in cognition. It is likely that this corpus will be suitable for studies investigating the effects of affective and lexico-semantic features on single word processing. It also allows a well-balanced selection of words employed for text processing research, so that the effect of text context can be separated from word level effects. The corpus finally has potential utility for application in research on affective disorders, neuropsychology and social cognitive neuroscience.

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Table 1. Descriptive statistics of rated and objective features broken down by valence category: positive (from 3 to 1), negative (from -3 to -1) and neutral (from 0.8 to -0.8) words. Words which fell in between positive and neutral categories (10 words) or negative and neutral categories (10 words) are not included.

	Positive (106 words)				**Neutral (80 words)**				**Negative (94 words)**			
	Mean	SD	Min	Max	**Mean**	SD	Min	Max	**Mean**	SD	Min	Max
Emotional Valence	**1,61**	.39	.99	2.52	**.27**	.38	-.73	.80	**-1.66**	.41	-1	-2.66
Emotional Valence^2	**2.73**	1.30	.98	6.37	**.21**	.20	.00	.65	**2.92**	1.44	1.00	7.07
Arousal	**3.55**	.73	2.08	5.35	**2.49**	.56	1.50	4.15	**4.44**	.76	2.61	5.96
Familiarity	**5.11**	.80	3.06	6.62	**4.58**	1.04	2.29	6.52	**4.56**	.75	2.80	6.55
Age of Acquisition	**3.74**	1.02	1.62	5.63	**3.90**	1.00	1.73	6.18	**4.02**	.84	1.84	5.46
Imageability	**3.94**	1.40	1.93	6.71	**4.00**	1.51	1.87	6.67	**3.93**	1.06	1.96	6.51
Length in letters	**7**	2	3	12	**6**	2	3	12	**7**	2	3	13
Length in phonemes	**6**	2	2	13	**5**	2	2	12	**6**	2	2	12
Length in syllables	**2**	1	1	5	**2**	1	1	4	**2**	1	1	4
Log Frequency	**.61**	.58	.00	2.97	**1.50**	.56	.30	2.48	**1.28**	.52	.00	2.43
Frequency (Mln)	**61**	111	.00	941	**61**	70	1	301	**35**	43	.00	267

Table 2. Frequencies of positive, neutral and negative words broken down by grammatical category.

Grammatical category	Positive	Neutral	Negative	Total
Nouns	41	42	29	112
Adjectives	37	11	39	87
Verbs	9	9	3	21
Nouns + Verbs	13	16	20	49
Nouns + Adjectives	2	1	2	5
Adjectives + Verbs	3	1	0	4
Nouns + Adj. + Verbs	1	0	1	2
Total	106	80	94	280

Table 3. Correlations among lexico-semantic features (r-values) and their significance levels.

	Familiarity	AoA	Imageability	Log Freq	Letters	Phonemes	Syllables
Familiarity	1	-.67***	.40***	.35***	.02	.13*	-.07
AoA	-.67***	1	-.57***	-.03	.07	.06	.08
Imageability	.40***	-.57***	1	.04	-.01	-.05	.04
Log Freq	.35***	-.03	.04	1	-.01	-.10	.12*
Letters	.02	.07	-.01	-.01	1	.70***	.05
Phonemes	.13*	.06	-.05	-.10	.70***	1	.53***
Syllables	-.07	.08	.04	.12*	.05	.53***	1

significance levels: *** = .001, ** = .01, * = .05

Table 4. Correlations (r-values) between each affective feature and lexico-semantic features, with their significance levels.

	Familiarity	AoA	Imageability	Log Freq	Letters	Phonemes	Syllables
Arousal	.14*	-.13*	.15**	-.04	-.03	.05	.05
Em. Valence	.29***	.08	.13*	.04	.05	.07	.10

significance levels: *** = .001, ** = .01, * = .05

Figure Caption

Figure 1. Emotional valence ratings plotted with arousal ratings.

Appendix A. Sussex Affective Word List (SAWL).

Word	Lexical Class	Valence			Arousal		Familiarity		Age of Acquisition		Imageability		Concrete-ness	Letters	Phonemes	Syllables	Frequency
	noun/verb/adjective	mean	sd	Category: neutral/positive/ negative	mean	sd	mean	sd	mean	sd	mean	sd	abstract/ concrete	no	no	no	no per million
abandon	verb	-1.89	0.86	negative	4.57	1.71	3.72	1.54	4.61	0.87	2.84	1.27	abstract	7	7	3	6
abbey	noun	0.04	0.66	neutral	1.71	1.17	2.48	1.59	5.12	0.87	5.23	1.80	concrete	5	3	2	10
abundance	noun	0.64	1.15	neutral	2.96	1.64	3.10	1.54	5.72	0.70	3.03	1.57	abstract	9	8	3	7
accent	noun	0.22	0.61	neutral	2.30	1.56	4.88	1.53	4.46	0.72	2.67	1.83	abstract	6	6	2	26
acceptance	noun	1.50	0.91	positive	2.84	1.67	4.40	1.55	4.89	0.85	2.45	1.53	abstract	10	9	3	23
accomplish	verb	1.80	0.94	positive	4.00	1.75	4.33	1.48	5.10	0.81	2.51	1.37	abstract	10	8	3	1
accused	noun, adjective	-1.50	0.76	negative	4.33	1.60	4.15	1.48	4.87	0.75	2.85	1.49	abstract	7	6	2	11
achievement	noun	2.17	0.80	positive	4.26	1.75	5.15	1.33	4.34	0.82	3.46	1.61	abstract	11	8	3	29
activity	noun	0.76	0.87	neutral	3.11	1.51	5.07	1.47	3.60	0.84	3.88	1.69	abstract	8	8	4	75
admire	verb	1.60	0.80	positive	3.52	1.60	4.71	1.34	4.74	0.84	2.93	1.45	abstract	6	6	3	4
affection	noun	2.05	0.86	positive	4.04	1.80	4.84	1.49	4.68	0.87	3.94	1.70	abstract	9	6	3	24
afraid	adjective	-1.65	0.73	negative	4.79	1.48	4.72	1.42	3.04	0.82	3.89	1.67	abstract	6	5	2	112
agitated	adjective	-1.34	0.61	negative	4.57	1.68	4.11	1.40	5.27	0.79	3.28	1.60	abstract	8	8	4	6
agony	noun	-2.49	0.74	negative	5.60	1.56	3.89	1.66	4.79	0.68	4.30	1.65	abstract	5	5	3	13
agreement	noun	1.10	0.88	positive	2.56	1.37	5.10	1.40	4.40	0.84	2.68	1.34	abstract	9	8	3	58
angel	noun	1.59	0.97	positive	3.29	1.72	3.98	1.75	2.76	0.76	6.37	0.96	concrete	5	5	2	11
angry	adjective	-1.94	0.82	negative	5.37	1.19	6.00	0.94	2.71	0.81	4.50	1.67	abstract	5	5	2	65
annoyed	adjective	-1.33	0.80	negative	4.50	1.61	5.78	1.11	3.84	0.92	3.43	1.51	abstract	7	4	2	3
antagonist	noun	-0.84	0.82	interm. negative	3.54	1.84	2.73	1.74	6.30	0.71	2.46	1.47	abstract	10	10	4	1
anxious	adjective	-1.43	0.88	negative	5.07	1.55	4.93	1.45	4.89	0.72	3.12	1.56	abstract	7	6	2	41
apathetic	adjective	-0.53	1.18	neutral	2.47	1.44	3.23	1.74	6.18	0.69	2.08	1.35	abstract	9	9	4	2
appreciated	adjective	1.78	0.93	positive	3.54	1.58	5.09	1.20	4.76	0.75	2.39	1.10	abstract	11	10	5	2
argument	noun	-1.56	0.83	negative	5.10	1.41	5.40	1.11	3.72	0.85	4.07	1.60	abstract	8	8	3	88
army	noun	-0.85	1.01	interm. negative	3.93	1.62	4.02	1.62	3.67	0.75	6.05	1.27	abstract	4	3	2	108
arrest	verb, noun	-1.23	0.79	negative	4.41	1.47	4.34	1.61	4.17	0.70	4.96	1.57	abstract	6	5	2	14
ashamed	adjective	-1.70	0.81	negative	4.15	1.73	4.46	1.48	4.55	1.03	3.37	1.69	abstract	7	5	2	22
assured	adjective	1.26	0.87	positive	2.67	1.49	4.20	1.49	5.16	0.79	2.16	1.15	abstract	7	4	2	11
astonished	adjective	0.33	0.82	neutral	4.15	1.49	3.68	1.46	5.06	0.73	3.26	1.65	abstract	10	8	3	2
attack	verb, noun	-1.79	0.83	negative	5.61	1.43	4.48	1.53	3.79	0.84	4.99	1.29	abstract	6	4	2	92
attic	noun	0.09	0.74	neutral	1.96	1.36	3.21	1.76	3.59	0.83	6.00	1.28	concrete	5	4	2	7
attracted	adjective	1.93	0.84	positive	4.43	1.66	5.57	1.30	4.57	0.83	3.55	1.63	abstract	9	8	3	5
avoid	verb	-0.99	0.82	interm. negative	3.39	1.65	5.01	1.30	4.35	0.81	2.60	1.39	abstract	5	4	2	19
bad	adjective	-1.63	0.91	negative	4.00	1.58	5.96	1.14	1.84	0.68	3.20	1.74	abstract	3	3	1	209
ban	verb, noun	-0.89	0.79	interm. negative	3.37	1.68	4.38	1.61	4.39	0.94	2.35	1.25	abstract	3	3	1	11
banner	noun	0.13	0.66	neutral	1.90	1.28	3.40	1.55	4.26	0.77	5.32	1.65	concrete	6	5	2	7
battle	noun	-1.27	0.99	negative	4.62	1.57	3.87	1.65	3.85	0.89	5.68	1.37	abstract	6	4	2	70
beach	noun	1.89	1.01	positive	3.72	1.85	5.67	1.37	2.76	0.70	6.68	0.70	concrete	5	3	1	59
benefit	verb, noun	1.26	0.83	positive	2.95	1.44	4.66	1.40	4.71	0.73	2.40	1.34	abstract	7	7	3	73
betrayed	adjective	-2.27	0.79	negative	5.29	1.57	4.17	1.59	4.79	0.84	2.98	1.55	abstract	8	6	2	2
bill	verb, noun	-0.89	0.89	interm. negative	2.63	1.64	4.96	1.54	4.23	0.93	5.02	1.75	concrete	4	3	1	54
birthday	noun	1.98	1.04	positive	4.41	1.87	6.05	1.04	1.99	0.71	5.83	1.37	abstract	8	5	2	20
bold	adjective	0.65	0.88	neutral	3.29	1.61	4.06	1.67	4.23	0.82	3.18	1.72	abstract	4	4	1	11
bomb	verb, noun	-2.29	0.79	negative	5.78	1.24	4.05	1.69	3.93	0.78	6.21	1.04	concrete	4	3	1	29
book	verb, noun	0.80	1.06	neutral	1.99	1.31	6.52	0.74	2.01	0.69	6.56	1.02	concrete	4	3	1	270
bored	adjective	-1.21	0.73	negative	2.61	1.51	6.18	1.16	3.16	0.81	3.61	1.63	abstract	5	3	1	5
boy	noun	0.66	0.92	neutral	2.65	1.68	6.43	0.93	1.82	0.57	6.50	0.93	concrete	3	2	1	216
brag	verb	-1.24	0.78	negative	3.24	1.61	3.84	1.67	4.66	0.80	2.98	1.49	abstract	4	4	1	0
brave	adjective	1.78	0.77	positive	4.43	1.56	4.55	1.44	3.23	0.82	3.49	1.60	abstract	5	4	1	19
build	verb	0.54	0.82	neutral	2.22	1.25	4.54	1.36	2.82	0.79	4.61	1.52	abstract	5	4	1	21
burden	verb, noun	-1.38	0.76	negative	3.65	1.60	3.62	1.60	5.21	0.83	2.94	1.52	abstract	6	4	2	27
burn	verb, noun	-1.35	0.87	negative	4.61	1.51	4.54	1.55	3.21	0.97	5.52	1.28	abstract	4	3	1	12

Word	Lexical Class	Valence			Arousal		Familiarity		Age of Acquisition		Imageability		Concrete-ness	Letters	Phonemes	Syllables	Frequency
	noun/verb/adjective	mean	sd	Category: neutral/positive/ negative	mean	sd	mean	sd	mean	sd	mean	sd	abstract/ concrete	no	no	no	no per million
calm	verb, noun, adjective	1.54	0.86	positive	2.43	1.65	5.27	1.32	3.55	1.04	3.50	1.54	abstract	4	3	1	34
capable	adjective	1.32	0.89	positive	2.62	1.35	4.65	1.56	4.70	0.75	2.10	1.06	abstract	7	6	3	54
caring	verb, adjective	2.06	0.84	positive	3.54	1.58	5.61	1.15	3.61	0.89	3.51	1.64	abstract	6	5	2	14
carnival	noun	1.43	1.01	positive	4.16	1.88	3.34	1.63	4.13	0.86	5.85	1.41	abstract	8	6	3	3
ceiling	noun	0.06	0.33	neutral	1.54	1.02	4.49	1.67	3.20	0.79	6.20	1.23	concrete	7	5	2	26
celebrate	verb	2.06	0.79	positive	4.45	1.67	5.23	1.35	3.83	0.80	4.68	1.46	abstract	9	8	3	3
cellar	noun	-0.21	0.72	neutral	2.01	1.21	3.12	1.68	4.17	0.98	6.13	1.17	concrete	6	5	2	10
chance	noun	0.78	0.97	neutral	3.18	1.72	5.38	1.26	3.96	0.79	2.11	1.11	abstract	6	4	1	146
change	verb, noun	0.29	0.88	neutral	3.39	1.72	5.65	1.17	3.20	0.84	2.77	1.57	abstract	5	4	1	155
chaos	noun	-1.43	1.04	negative	5.21	1.42	3.99	1.75	4.90	0.78	4.71	1.61	abstract	5	4	2	15
cheerful	adjective	1.84	0.78	positive	3.67	1.69	5.13	1.42	3.65	0.79	4.00	1.66	abstract	8	5	2	18
chocolate	noun	1.60	1.03	positive	3.67	1.89	6.33	0.83	2.38	0.70	6.60	0.90	concrete	9	7	3	13
choose	verb	0.28	1.01	neutral	2.63	1.43	5.85	1.23	3.11	0.94	2.31	1.25	abstract	6	3	1	16
church	noun	-0.06	1.26	neutral	2.55	1.61	4.24	1.79	2.87	0.83	6.43	1.10	concrete	6	3	1	159
clearheaded	adjective	1.12	0.82	positive	2.09	1.24	3.63	1.70	5.17	0.77	2.35	1.47	abstract	11	9	3	0
collapse	verb, noun	-1.38	0.81	negative	4.02	1.65	3.83	1.57	4.45	0.77	4.41	1.43	abstract	8	6	2	17
collective	noun, adjective	0.52	0.74	neutral	2.07	1.23	3.83	1.52	4.99	0.87	2.73	1.55	abstract	10	8	3	29
comfortable	adjective	1.65	0.81	positive	2.54	1.44	5.73	1.13	3.78	0.94	3.48	1.62	abstract	11	9	4	44
command	verb, noun	-0.33	0.77	neutral	3.63	1.75	3.38	1.56	4.61	0.90	2.91	1.46	abstract	7	6	2	46
compel	verb	0.35	0.80	neutral	3.06	1.60	3.41	1.55	5.66	0.73	3.10	10.85	abstract	6	6	2	1
complaint	noun	-1.02	0.63	negative	3.41	1.46	4.94	1.45	4.56	0.77	2.62	1.43	abstract	9	8	2	13
concentrated	adjective	0.40	0.70	neutral	2.85	1.51	5.24	1.30	4.45	0.83	2.96	1.64	abstract	12	12	4	17
confident	adjective	1.57	0.70	positive	3.43	1.66	5.50	1.20	4.49	0.74	3.22	1.53	abstract	9	9	3	28
conflict	noun	-1.62	0.84	negative	4.80	1.44	4.46	1.63	4.83	0.77	4.18	1.44	abstract	8	8	2	47
confused	adjective	-0.98	0.68	interm. negative	3.40	1.55	5.79	1.07	3.95	0.90	3.17	1.65	abstract	8	8	2	19
corpse	noun	-2.61	0.58	negative	4.93	1.82	2.80	1.72	5.02	0.70	5.87	1.19	concrete	6	4	1	10
cowardly	adjective	-1.52	0.96	negative	3.79	1.65	3.57	1.46	4.60	1.04	2.99	1.37	abstract	8	6	3	3
crime	noun	-1.60	0.84	negative	4.46	1.45	4.91	1.64	4.00	0.77	4.84	1.59	abstract	5	4	1	49
crisis	noun	-1.83	0.77	negative	5.32	1.51	4.11	1.66	4.80	0.67	3.46	1.64	abstract	6	6	2	59
cry	verb, noun	-1.38	0.96	negative	4.90	1.53	5.94	1.00	1.99	0.68	5.91	1.17	abstract	3	3	1	27
culture	noun	0.88	1.01	interm. positive	2.95	1.55	4.74	1.55	5.02	0.82	3.48	1.71	abstract	7	6	2	68
curious	adjective	0.73	0.89	neutral	3.43	1.63	4.56	1.40	4.24	0.78	2.84	1.46	abstract	7	6	2	51
damage	verb, noun	-1.35	0.65	negative	4.34	1.48	4.74	1.46	3.65	0.76	4.29	1.65	abstract	6	5	2	46
dance	verb, noun	1.95	0.97	positive	4.40	1.80	6.00	1.04	2.46	0.76	6.07	1.18	abstract	5	4	1	34
dangerous	adjective	-1.79	0.87	negative	5.33	1.38	5.07	1.44	2.99	0.88	4.24	1.53	abstract	9	8	3	82
defeated	adjective	-1.79	0.78	negative	4.17	1.62	3.74	1.60	4.62	0.80	3.17	1.67	abstract	8	7	2	3
defence	noun	-0.04	0.91	neutral	3.38	1.45	4.16	1.52	4.61	0.80	3.17	1.41	abstract	7	6	2	103
delighted	adjective	2.22	0.82	positive	4.32	1.72	4.70	1.43	4.34	0.88	4.04	1.77	abstract	9	7	3	6
depressed	adjective	-2.10	0.81	negative	4.54	1.72	5.35	1.40	5.17	0.73	3.72	1.77	abstract	9	7	2	17
desert	verb, noun	0.21	0.99	neutral	2.71	1.67	3.89	1.66	3.67	0.83	6.20	1.20	concrete	6	5	2	37
despair	verb, noun	-2.11	0.89	negative	4.91	1.60	3.67	1.71	4.99	0.75	3.29	1.54	abstract	7	6	2	27
destroy	verb	-1.94	0.78	negative	5.35	1.58	4.27	1.62	4.02	0.80	4.72	1.50	abstract	7	6	2	11
devil	noun	-1.85	1.09	negative	4.39	1.86	3.43	1.80	3.63	0.90	6.02	1.29	concrete	5	4	2	26
disappointed	adjective	-1.51	0.69	negative	3.50	1.57	5.29	1.31	4.06	0.81	2.94	1.29	abstract	12	11	4	21
discouraged	adjective	-1.26	0.66	negative	3.07	1.32	3.80	1.63	5.07	0.72	2.01	1.06	abstract	11	9	3	2
discover	verb	1.07	0.94	positive	3.88	1.67	4.54	1.54	3.95	0.77	3.17	1.49	abstract	8	8	3	11
discussion	noun	0.52	0.91	neutral	2.82	1.63	5.54	1.21	4.51	0.81	3.24	1.65	abstract	10	7	3	61
disregarded	adjective	-1.38	0.88	negative	3.17	1.75	3.59	1.67	5.46	0.74	2.30	1.51	abstract	11	11	4	1
distracted	adjective	-0.73	0.69	neutral	2.90	1.44	5.41	1.38	4.48	0.86	2.61	1.35	abstract	10	10	3	4
distressed	adjective	-1.63	0.84	negative	4.80	1.49	4.48	1.46	4.82	0.92	3.72	1.62	abstract	10	8	2	2

Word	Lexical Class	Valence			Arousal		Familiarity		Age of Acquisition		Imageability		Concrete-ness	Letters	Phonemes	Syllables	Frequency
	noun/verb/adjective	mean	sd	Category: neutral/positive/ negative	mean	sd	mean	sd	mean	sd	mean	sd	abstract/ concrete	no	no	no	no per million
divorce	verb, noun	-1.88	1.00	negative	4.46	1.83	4.49	1.69	4.33	0.83	3.38	1.79	abstract	7	5	2	21
doubt	verb, noun	-1.02	0.68	negative	3.33	1.47	5.04	1.39	4.40	0.77	2.04	1.12	abstract	5	3	1	138
dream	verb, noun	1.54	0.93	positive	4.21	1.74	6.07	0.93	2.88	0.76	4.83	1.76	abstract	5	4	1	50
drop	verb, noun	-0.38	0.60	neutral	2.33	1.33	5.32	1.44	2.67	0.83	4.18	1.72	concrete	4	4	1	34
easy	adjective	1.11	0.70	positive	2.21	1.23	6.10	1.01	2.67	0.67	2.23	1.23	abstract	4	3	2	150
embarrassed	adjective	-1.27	0.89	negative	4.59	1.49	5.67	1.20	3.94	0.92	4.16	1.62	abstract	11	8	3	4
encouraged	adjective	1.73	0.90	positive	3.52	1.74	5.32	1.30	4.51	0.74	3.00	1.49	abstract	10	8	3	8
enemy	noun	-1.89	0.79	negative	4.91	1.42	4.28	1.69	3.73	0.75	4.16	1.77	abstract	5	5	3	50
energised	adjective	1.61	0.83	positive	4.52	1.48	4.07	1.53	4.98	0.75	3.55	1.59	abstract	9	7	3	0
enjoy	verb	2.06	0.82	positive	3.91	1.58	6.11	1.01	3.11	0.79	3.50	1.53	abstract	5	4	2	17
enthusiastic	adjective	1.91	0.76	positive	4.41	1.81	5.28	1.27	4.87	0.72	3.48	1.53	abstract	12	13	5	15
evening	noun	0.94	0.99	interm. positive	2.41	1.48	6.33	1.01	3.06	0.76	5.22	1.65	abstract	7	5	3	183
evil	adjective	-2.33	0.85	negative	5.12	1.63	4.32	1.74	3.49	0.85	4.35	1.84	abstract	4	3	2	52
excited	adjective	2.00	0.79	positive	5.24	1.55	6.16	1.04	3.02	0.83	4.09	1.62	abstract	7	7	3	24
excluded	adjective	-1.85	0.88	negative	3.99	1.73	3.84	1.58	4.82	0.72	3.16	1.56	abstract	8	9	3	3
exhausted	adjective	-1.33	0.94	negative	3.85	1.66	5.44	1.32	4.56	0.74	3.73	1.59	abstract	9	8	3	5
failure	noun	-2.04	0.73	negative	4.39	1.59	4.79	1.61	4.35	0.88	2.85	1.54	abstract	7	6	2	67
faith	noun	0.77	1.26	neutral	3.24	1.67	4.34	1.69	4.56	0.92	2.91	1.71	abstract	5	3	1	51
familiar	adjective	1.01	0.82	positive	2.41	1.34	5.06	1.50	4.26	0.90	2.23	1.19	abstract	8	8	3	65
family	noun	2.27	1.02	positive	3.89	1.82	6.32	0.95	2.32	0.74	6.05	1.39	abstract	6	6	3	328
farewell	noun	-1.07	0.95	negative	3.33	1.51	3.56	1.87	4.30	0.90	3.68	1.72	abstract	8	6	2	8
father	verb, noun	1.85	1.22	positive	3.33	1.90	5.98	1.26	1.91	0.77	6.39	1.11	concrete	6	5	2	272
fault	noun	-1.17	0.66	negative	3.62	1.58	4.96	1.38	3.55	1.04	2.56	1.46	abstract	5	4	1	38
feel	verb	0.82	0.93	interm. positive	3.65	1.57	6.06	1.05	2.96	0.79	2.33	1.34	abstract	4	3	1	109
film	verb, noun	0.96	0.99	interm. positive	2.98	1.60	6.34	0.83	3.05	0.77	5.84	1.42	concrete	4	4	1	87
fire	verb, noun	-1.17	1.27	negative	5.41	1.37	4.79	1.55	2.41	0.75	6.51	0.96	concrete	4	4	2	148
follower	noun	-0.09	0.80	neutral	2.23	1.16	3.73	1.56	4.18	0.82	3.26	1.59	abstract	8	6	3	2
forest	noun	0.66	0.92	neutral	2.28	1.42	4.11	1.66	3.28	0.74	6.48	1.08	concrete	6	6	2	68
forget	verb	-0.90	0.70	interm. negative	2.99	1.45	5.90	1.19	3.40	0.80	2.32	1.12	abstract	6	5	2	19
fortune	noun	1.46	0.88	positive	3.82	1.69	4.22	1.55	4.56	0.83	4.05	1.85	abstract	7	5	2	29
fragrant	adjective	0.99	0.76	positive	2.48	1.58	3.06	1.69	5.24	0.71	2.91	1.66	abstract	8	8	2	3
friend	noun	2.52	0.67	positive	4.24	1.85	6.62	0.70	2.22	0.65	5.74	1.27	concrete	6	5	1	172
frightened	adjective	-1.78	0.70	negative	5.05	1.54	4.65	1.43	3.23	0.97	4.16	1.64	abstract	10	6	2	39
frustrated	adjective	-1.46	0.72	negative	4.76	1.51	5.18	1.40	4.46	0.88	3.26	1.51	abstract	10	10	3	3
fulfilled	adjective	1.76	0.99	positive	3.30	1.59	4.22	1.53	5.11	0.70	2.30	1.45	abstract	9	7	2	2
furious	adjective	-2.13	0.80	negative	5.37	1.63	4.48	1.64	4.22	0.89	4.22	1.60	abstract	7	6	2	15
garden	noun	1.00	1.02	positive	2.12	1.41	5.38	1.39	2.35	0.78	6.43	0.88	concrete	6	4	2	110
gift	noun	1.74	0.89	positive	3.84	1.81	4.87	1.46	3.30	0.87	5.93	1.12	concrete	4	4	1	31
giggle	verb, noun	2.13	0.86	positive	4.18	1.72	5.22	1.63	3.16	0.78	4.96	1.54	concrete	6	4	2	3
girl	noun	0.74	0.94	neutral	2.56	1.59	6.51	0.81	1.73	0.52	6.43	1.09	concrete	4	3	1	276
give	verb	1.20	0.85	positive	2.76	1.54	6.22	1.04	2.23	0.96	3.44	1.68	abstract	4	3	1	121
glass	noun	0.00	0.65	neutral	2.17	1.49	6.22	1.21	2.62	0.81	6.30	1.11	concrete	5	4	1	125
good	noun, adjective	1.77	0.84	positive	2.99	1.63	6.52	0.88	1.87	0.73	2.93	1.69	abstract	4	3	1	941
greeting	verb, noun	0.88	0.76	interm. positive	2.35	1.33	4.41	1.56	4.32	0.80	3.83	1.59	abstract	8	6	2	11
guest	noun	0.57	0.69	neutral	2.26	1.32	4.94	1.38	3.65	0.89	4.35	1.57	concrete	5	4	1	24
happy	adjective	2.45	0.67	positive	4.71	1.75	6.39	0.89	2.18	0.76	4.77	1.79	abstract	5	4	2	135
harm	verb, noun	-1.84	0.94	negative	4.83	1.58	4.38	1.62	3.71	0.90	3.45	1.56	abstract	4	3	1	31
hateful	adjective	-2.13	0.73	negative	5.12	1.48	3.95	1.71	4.29	0.94	3.12	1.55	abstract	7	6	2	4
healed	adjective	1.62	0.86	positive	3.21	1.47	4.21	1.67	4.09	0.95	3.44	1.47	abstract	6	4	1	1
health	noun	1.43	1.16	positive	3.48	1.74	5.67	1.22	3.79	0.75	3.18	1.63	abstract	6	4	1	132

Word	Lexical Class	Valence			Arousal		Familiarity		Age of Acquisition		Imageability		Concrete-ness	Letters	Phonemes	Syllables	Frequency
	noun/verb/adjective	mean	sd	Category: neutral/positive/ negative	mean	sd	mean	sd	mean	sd	mean	sd	abstract/ concrete	no	no	no	no per million
heart	noun	1.49	1.05	positive	4.22	1.82	5.43	1.38	2.98	0.79	6.38	1.10	concrete	5	3	1	145
heaven	noun	1.56	1.08	positive	3.67	1.71	4.49	1.67	2.94	0.74	5.40	1.65	abstract	6	4	2	33
hell	noun	-2.22	0.90	negative	4.83	1.85	4.29	1.81	3.57	0.86	5.43	1.55	abstract	4	3	1	94
helpful	adjective	1.61	0.81	positive	2.84	1.46	5.50	1.23	3.13	0.73	3.30	1.71	abstract	7	7	2	26
hero	noun	1.82	0.96	positive	4.29	1.87	4.30	1.68	3.35	0.76	5.27	1.54	concrete	4	4	2	30
herring	noun	-0.15	0.76	neutral	1.50	1.07	2.29	1.62	5.20	0.83	5.42	1.73	concrete	7	5	2	3
holiday	noun	2.39	0.77	positive	4.57	1.91	5.90	1.18	2.80	0.66	5.96	1.22	abstract	7	6	3	58
housewife	noun	0.02	0.85	neutral	2.12	1.39	4.04	1.77	4.46	0.83	5.74	1.32	concrete	9	6	2	9
hurt	verb, noun, adjective	-1.68	0.91	negative	4.78	1.56	5.65	1.13	2.39	0.75	4.40	1.62	abstract	4	3	1	7
idea	noun	1.06	0.85	positive	3.06	1.64	5.85	1.02	3.43	0.69	3.11	1.65	abstract	4	3	2	272
illness	noun	-1.98	0.94	negative	3.89	1.71	5.00	1.51	3.28	0.91	4.61	1.58	abstract	7	5	2	34
imagine	verb	1.30	0.96	positive	3.44	1.59	5.46	1.15	3.73	0.86	2.68	1.55	abstract	7	6	3	21
incapable	adjective	-1.49	0.95	negative	3.68	1.62	3.93	1.53	5.13	0.70	2.11	1.10	abstract	9	8	4	14
indifferent	adjective	-0.30	0.70	neutral	2.23	1.27	3.77	1.80	5.44	0.79	2.05	1.21	abstract	11	9	3	13
individual	noun, adjective	0.93	0.93	interm. positive	2.90	1.51	5.27	1.32	4.63	0.85	3.68	1.79	abstract	10	10	4	146
initiative	noun	1.16	0.94	positive	3.40	1.62	4.17	1.58	5.54	0.69	2.07	1.20	abstract	10	8	4	18
innocent	noun, adjective	1.04	0.94	positive	3.04	1.60	4.68	1.46	4.40	0.86	3.09	1.74	abstract	8	6	3	39
inspired	adjective	1.78	0.74	positive	4.34	1.66	4.43	1.39	5.06	0.65	2.56	1.39	abstract	8	7	3	10
interested	adjective	1.43	0.79	positive	3.46	1.62	5.66	1.22	3.94	0.88	2.55	1.26	abstract	10	9	3	103
intonation	noun	0.05	0.52	neutral	1.88	1.05	2.68	1.51	6.16	0.81	1.87	1.21	abstract	10	9	4	4
invitation	noun	1.12	0.79	positive	2.82	1.48	4.78	1.53	3.63	0.81	4.78	1.72	abstract	10	9	4	20
job	noun	0.15	0.92	neutral	2.72	1.64	6.30	1.06	3.17	0.84	4.76	1.75	abstract	3	3	1	244
joining	verb	0.50	0.82	neutral	2.18	1.31	4.21	1.56	4.01	0.88	2.68	1.46	abstract	7	5	2	16
journey	verb, noun	1.07	0.97	positive	3.37	1.88	5.32	1.38	3.54	0.86	4.39	1.52	abstract	7	4	2	51
kiss	verb, noun	2.46	0.74	positive	5.35	1.63	6.34	0.80	2.34	0.82	6.37	1.01	concrete	4	3	1	17
lack	verb, noun	-1.06	0.62	negative	2.65	1.32	4.30	1.56	4.57	0.83	1.96	1.16	abstract	4	3	1	83
lake	noun	0.61	0.83	neutral	1.90	1.21	3.91	1.77	3.29	0.78	6.48	0.92	concrete	4	3	1	40
language	noun	0.44	0.86	neutral	2.11	1.20	5.11	1.73	3.82	0.79	2.33	1.45	abstract	8	7	2	131
laugh	verb, noun	2.43	0.77	positive	4.65	1.70	6.21	1.06	2.46	0.77	5.32	1.31	abstract	5	3	1	31
leader	noun	0.62	1.00	neutral	3.24	1.71	4.43	1.62	3.56	0.77	4.32	1.58	concrete	6	5	2	68
leave	verb, noun	-0.80	0.88	interm. negative	3.01	1.61	5.59	1.39	2.91	0.88	3.24	1.58	abstract	5	3	1	68
lie	verb, noun	-1.51	0.89	negative	4.48	1.63	5.63	1.14	2.73	0.79	2.83	1.62	abstract	3	2	1	28
lip	noun	0.57	0.83	neutral	2.51	1.60	5.16	1.49	2.50	0.79	6.45	0.90	concrete	3	3	1	17
lively	adjective	1.72	0.82	positive	4.55	1.77	5.29	1.19	4.13	0.78	4.05	1.57	abstract	6	5	2	14
lonely	adjective	-2.35	0.69	negative	4.38	1.82	5.10	1.54	3.85	0.86	3.63	1.64	abstract	6	5	2	28
loser	noun	-1.43	0.90	negative	3.65	1.48	5.24	1.61	3.71	0.92	3.47	1.61	concrete	5	5	2	3
loss	noun	-1.71	0.75	negative	4.06	1.78	4.55	1.66	3.89	0.96	2.74	1.49	abstract	4	3	1	78
lovable	adjective	1.96	0.82	positive	4.13	1.54	4.95	1.45	3.95	1.02	3.56	1.60	abstract	7	6	3	4
loyalty	noun	1.88	1.01	positive	3.56	1.66	4.55	1.45	4.80	0.81	2.54	1.36	abstract	7	6	3	18
lust	noun	1.51	0.96	positive	5.32	1.38	4.20	1.65	5.63	0.69	4.00	1.68	abstract	4	4	1	10
marriage	noun	1.30	1.39	positive	3.90	1.72	5.05	1.65	3.39	0.83	5.41	1.48	abstract	8	5	2	93
matching	verb, adjective	0.24	0.64	neutral	1.94	1.07	4.18	1.60	3.76	0.90	3.37	1.89	abstract	8	5	2	8
meeting	verb, noun	0.26	0.80	neutral	2.55	1.34	5.40	1.18	3.77	0.86	4.24	1.70	abstract	7	5	2	145
member	noun	0.52	0.71	neutral	2.18	1.30	4.56	1.53	4.00	0.72	3.06	1.53	concrete	6	6	2	97
memory	noun	0.73	0.94	neutral	2.73	1.58	5.60	1.32	3.91	0.82	2.59	1.59	abstract	6	6	3	64
merit	noun	1.05	0.90	positive	2.41	1.40	3.16	1.62	4.62	0.98	2.71	1.61	abstract	5	5	2	10
milk	verb, noun	0.26	0.84	neutral	1.67	1.09	6.10	1.34	1.82	0.83	6.38	1.23	concrete	4	4	1	101
million	noun	0.80	0.97	interm. positive	3.49	1.91	4.93	1.47	3.83	0.90	4.27	1.92	abstract	7	6	2	196
misfortune	noun	-1.37	0.75	negative	3.60	1.55	3.80	1.52	5.09	0.79	2.41	1.22	abstract	10	8	3	7
mistake	verb, noun	-1.33	0.79	negative	3.79	1.66	5.41	1.32	3.35	0.99	2.61	1.47	abstract	7	6	2	47
misunderstood	adjective	-1.04	0.67	negative	3.10	1.45	4.30	1.52	4.67	0.77	2.27	1.27	abstract	13	12	4	1

Word	Lexical Class	Valence			Arousal		Familiarity		Age of Acquisition		Imageability		Concrete-ness	Letters	Phonemes	Syllables	Frequency
	noun/verb/adjective	mean	sd	Category: neutral/positive/ negative	mean	sd	mean	sd	mean	sd	mean	sd	abstract/ concrete	no	no	no	no per million
monster	noun	-1.07	1.10	negative	4.39	1.69	3.56	1.69	2.46	0.76	6.06	1.15	concrete	7	7	2	15
moon	verb, noun	0.85	0.94	interm. positive	2.45	1.46	5.12	1.47	2.45	0.76	6.56	0.89	concrete	4	3	1	53
morning	noun	0.66	1.06	neutral	2.66	1.51	6.44	1.04	2.46	0.79	5.57	1.48	abstract	7	5	2	301
mother	verb, noun	2.28	1.00	positive	3.51	1.87	6.33	0.98	1.79	0.75	6.40	1.12	concrete	6	5	2	410
motivated	adjective	1.56	0.82	positive	3.99	1.55	5.39	1.33	4.98	0.81	2.65	1.25	abstract	9	9	4	2
murder	verb, noun	-2.66	0.63	negative	5.95	1.29	4.35	1.63	4.13	0.80	5.45	1.42	abstract	6	5	2	46
Nazi	noun	-2.50	0.72	negative	5.44	1.56	3.78	1.90	5.13	0.73	6.04	1.26	abstract	4	5	2	13
nightmare	noun	-2.23	0.81	negative	5.56	1.33	5.24	1.32	2.90	0.81	5.04	1.71	abstract	9	6	2	13
opinion	noun	0.51	0.74	neutral	2.88	1.60	5.59	1.10	4.45	0.74	2.05	1.34	abstract	7	7	3	76
opposite	adjective	-0.01	0.56	neutral	2.13	1.24	5.27	1.30	3.73	0.93	3.00	1.73	abstract	8	6	3	73
ordinary	adjective	-0.15	0.79	neutral	1.99	1.28	4.76	1.44	4.24	0.79	2.34	1.34	abstract	8	5	3	96
organ	noun	0.12	0.67	neutral	2.22	1.30	3.79	1.66	4.57	0.79	5.53	1.34	concrete	5	4	2	13
original	noun, adjective	0.98	0.89	interm. positive	2.39	1.46	5.20	1.29	4.60	0.86	2.20	1.58	abstract	8	7	4	89
parting	verb, noun	-0.67	0.85	neutral	3.01	1.75	3.60	1.60	4.41	0.90	3.20	1.60	abstract	7	5	2	8
peace	noun	2.09	0.89	positive	2.98	1.68	4.74	1.61	3.87	0.84	3.74	1.75	abstract	5	3	1	89
play	verb, noun	1.55	0.98	positive	3.55	1.57	5.74	1.33	1.88	0.66	4.94	1.67	abstract	4	3	1	151
poet	noun	0.59	0.87	neutral	2.11	1.36	3.78	1.85	4.13	0.73	4.34	1.70	concrete	4	4	2	17
poverty	noun	-2.13	0.78	negative	4.52	1.73	4.32	1.65	4.79	0.90	5.04	1.45	abstract	7	6	3	57
praise	verb, noun	1.72	0.82	positive	3.57	1.56	4.29	1.61	4.02	0.93	2.91	1.50	abstract	6	4	1	15
prepared	adjective	1.06	0.85	positive	2.51	1.25	5.01	1.37	4.40	0.83	2.41	1.31	abstract	8	6	2	87
prison	noun	-1.96	0.82	negative	4.57	1.55	4.16	1.65	3.77	0.81	6.18	0.88	concrete	6	5	2	69
problem	noun	-1.15	0.67	negative	3.68	1.56	6.00	0.96	3.41	0.80	2.54	1.29	abstract	7	7	2	267
profit	verb, noun	1.06	1.06	positive	3.20	1.67	4.41	1.61	5.00	0.80	3.28	1.67	abstract	6	6	2	34
promotion	noun	1.48	0.83	positive	3.63	1.67	4.34	1.69	5.17	0.77	3.07	1.52	abstract	9	7	3	15
protected	adjective	1.66	0.86	positive	3.15	1.60	4.63	1.46	4.13	0.84	3.53	1.48	abstract	9	9	3	5
proud	adjective	1.71	0.91	positive	3.77	1.58	5.07	1.24	4.13	1.03	3.21	1.64	abstract	5	4	1	39
punch	verb, noun	-1.29	0.94	negative	5.13	1.57	4.26	1.59	3.12	0.91	5.80	1.44	concrete	5	4	1	6
punished	adjective	-1.80	0.89	negative	4.55	1.56	4.34	1.65	3.43	0.86	3.91	1.60	abstract	8	6	2	2
pupil	noun	0.17	0.70	neutral	1.89	1.10	4.82	1.72	3.74	0.87	5.76	1.24	concrete	5	5	2	14
reach	verb, noun	0.29	0.62	neutral	2.04	1.19	4.95	1.29	3.10	0.84	3.71	1.64	abstract	5	3	1	36
receiver	noun	0.38	0.70	neutral	2.13	1.13	3.46	1.49	4.84	0.81	2.89	1.59	concrete	8	7	3	14
recovery	noun	1.34	0.88	positive	2.95	1.29	4.17	1.57	4.52	0.80	3.02	1.49	abstract	8	8	4	17
rejection	noun	-2.01	0.79	negative	4.72	1.67	4.22	1.60	4.78	0.80	3.12	1.72	abstract	9	7	3	15
relaxed	adjective	1.70	0.76	positive	2.49	1.51	5.78	1.10	4.16	0.79	3.96	1.81	abstract	7	7	2	6
release	verb	0.72	0.77	neutral	3.18	1.52	4.46	1.42	4.51	0.81	2.99	1.57	abstract	7	5	2	27
remember	verb	0.71	0.76	neutral	2.67	1.41	5.94	1.07	3.22	0.82	2.24	1.30	abstract	8	8	3	64
repair	verb	0.60	0.80	neutral	2.28	1.31	4.50	1.63	4.10	0.83	3.66	1.64	abstract	6	5	2	9
return	verb, noun	0.41	0.70	neutral	2.18	1.33	5.28	1.35	3.56	0.85	2.98	1.59	abstract	6	5	2	100
rewarded	adjective	1.68	0.78	positive	3.65	1.78	4.54	1.48	4.00	0.77	3.29	1.52	abstract	8	7	3	2
rise	verb, noun	0.59	0.82	neutral	2.37	1.30	4.28	1.60	3.88	0.93	3.50	1.71	abstract	4	3	1	54
sad	adjective	-1.93	0.73	negative	4.09	1.57	5.83	1.17	2.01	0.73	4.44	1.89	abstract	3	3	1	46
safe	adjective	1.83	0.86	positive	2.62	1.53	5.56	1.21	3.11	0.79	3.50	1.69	abstract	4	3	1	79
salary	noun	0.65	0.92	neutral	2.95	1.72	4.13	1.69	5.23	0.84	3.35	1.64	abstract	6	6	3	20
scissors	noun	-0.16	0.58	neutral	2.72	1.63	4.82	1.45	2.73	0.70	6.57	0.98	concrete	8	5	2	4
scream	verb, noun	-1.24	0.88	negative	5.54	1.22	4.77	1.48	2.79	0.84	5.48	1.58	abstract	6	5	1	7
sea	noun	1.30	1.15	positive	3.49	1.85	5.87	1.40	2.39	0.75	6.71	0.78	concrete	3	2	1	160
sensation	noun	1.06	0.89	positive	4.01	1.89	4.17	1.62	4.96	0.79	2.76	1.48	abstract	9	7	3	15
sing	verb	1.52	0.93	positive	3.74	1.73	5.74	1.26	2.40	0.78	5.46	1.34	abstract	4	3	1	6
situation	noun	0.00	0.27	neutral	1.99	1.21	5.43	1.40	4.38	0.76	2.28	1.38	abstract	9	9	4	171

Word	Lexical Class	Valence			Arousal		Familiarity		Age of Acquisition		Imageability		Concrete-ness	Letters	Phonemes	Syllables	Frequency
	noun/verb/adjective	mean	sd	Category: neutral/positive/ negative	mean	sd	mean	sd	mean	sd	mean	sd	abstract/ concrete	no	no	no	no per million
solution	noun	1.18	0.97	positive	2.83	1.59	4.89	1.43	4.48	0.80	2.35	1.22	abstract	8	6	3	53
soul	noun	1.06	1.09	positive	3.35	1.79	4.18	1.77	4.45	0.86	2.85	1.80	abstract	4	3	1	41
source	verb, noun	0.20	0.46	neutral	1.87	1.11	3.95	1.65	4.87	0.80	2.38	1.47	abstract	6	3	1	77
stability	noun	1.33	0.92	positive	2.34	1.20	4.04	1.69	5.24	0.76	2.50	1.35	abstract	9	9	4	15
stinking	adjective	-1.46	0.85	negative	3.33	1.56	3.65	1.64	3.51	0.85	3.56	1.67	abstract	8	7	2	4
strange	adjective	-0.24	0.78	neutral	3.38	1.51	5.48	1.25	3.61	0.91	2.93	1.62	abstract	7	6	1	101
stressed	adjective	-1.82	0.76	negative	4.78	1.65	6.11	0.90	4.66	0.85	3.82	1.67	abstract	8	6	1	2
strong	adjective	1.33	0.85	positive	4.06	1.74	5.56	1.11	2.94	0.88	4.62	1.73	abstract	6	5	1	167
success	noun	2.04	0.78	positive	4.06	1.61	5.23	1.29	4.26	0.73	3.48	1.61	abstract	7	6	2	102
successful	adjective	2.06	0.82	positive	4.01	1.62	5.40	1.13	4.37	0.78	3.34	1.51	abstract	10	9	3	81
sun	noun	1.90	1.04	positive	3.40	1.88	6.21	0.93	2.09	0.69	6.70	0.93	concrete	3	3	1	150
surprised	adjective	1.01	0.85	positive	4.35	1.58	5.51	1.11	3.49	0.91	3.99	1.67	abstract	9	7	2	61
suspicious	adjective	-1.16	0.81	negative	4.28	1.53	4.70	1.36	4.85	0.72	3.02	1.57	abstract	10	8	3	19
sympathy	noun	0.44	1.19	neutral	3.27	1.47	4.93	1.36	4.65	0.82	2.89	1.41	abstract	8	7	3	32
take	verb, noun	-0.15	0.61	neutral	2.39	1.48	5.87	1.31	2.44	0.97	3.12	1.74	abstract	4	3	1	192
teacher	noun	0.66	0.96	neutral	2.59	1.38	5.87	1.43	2.61	0.56	5.83	1.30	concrete	7	5	2	79
tell	verb	-0.05	0.41	neutral	2.09	1.21	5.93	1.20	2.66	0.77	3.06	1.60	abstract	4	3	1	112
terrified	adjective	-2.45	0.72	negative	5.96	1.17	4.27	1.52	4.10	0.86	4.48	1.63	abstract	9	7	3	3
thank	verb	1.45	0.93	positive	2.77	1.53	6.33	1.02	2.32	0.81	3.38	1.76	abstract	5	4	1	25
threat	noun	-1.90	0.84	negative	5.28	1.42	4.40	1.54	4.37	0.76	3.68	1.72	abstract	6	4	1	61
tired	adjective	-1.00	0.65	negative	3.02	1.63	6.55	0.77	2.30	0.86	4.26	1.77	abstract	5	4	2	66
toy	noun	1.26	0.97	positive	2.66	1.49	4.96	1.64	1.62	0.62	6.23	0.96	concrete	3	2	1	15
trap	verb, noun	-1.23	0.81	negative	3.93	1.73	3.94	1.67	3.59	0.85	4.59	1.78	abstract	4	4	1	18
treasure	verb, noun	1.70	0.87	positive	3.95	1.81	3.35	1.72	3.09	0.72	6.33	0.90	concrete	8	6	2	9
tree	noun	0.71	0.90	neutral	1.65	1.19	5.46	1.56	1.96	0.74	6.67	0.85	concrete	4	3	1	72
tricky	adjective	-0.52	0.86	neutral	3.45	1.59	4.32	1.30	3.99	0.79	2.42	1.33	abstract	6	5	2	7
trusting	verb, adjective	1.71	0.85	positive	3.32	1.62	4.94	1.38	4.20	0.81	2.46	1.30	abstract	8	7	2	4
truth	noun	1.80	0.91	positive	3.60	1.62	5.62	1.23	2.96	0.95	2.21	1.25	abstract	5	4	1	127
understood	adjective	1.23	0.92	positive	2.55	1.35	5.68	1.08	3.79	0.87	2.27	1.29	abstract	10	9	3	14
uninterested	adjective	-0.99	0.66	interm. negative	2.24	1.24	4.21	1.52	4.66	0.89	2.21	1.30	abstract	12	12	4	2
unsure	adjective	-0.91	0.67	interm. negative	3.02	1.57	5.20	1.31	4.12	0.91	2.50	1.30	abstract	6	5	2	0
useless	adjective	-2.02	0.83	negative	3.74	1.83	4.82	1.45	4.11	0.72	2.50	1.29	abstract	7	6	2	21
valley	noun	0.41	0.82	neutral	1.82	1.27	3.28	1.72	4.44	0.93	5.75	1.45	concrete	6	4	2	49
victim	noun	-1.84	0.88	negative	4.49	1.52	4.15	1.62	4.61	0.68	4.16	1.52	abstract	6	6	2	28
vow	verb, noun	0.48	0.83	neutral	2.88	1.58	3.29	1.61	5.00	0.79	3.21	1.79	abstract	3	2	1	5
weak	adjective	-1.29	0.62	negative	3.45	1.55	4.95	1.43	3.85	0.83	3.73	1.72	abstract	4	3	1	47
wealth	noun	1.29	1.16	positive	3.88	1.70	4.57	1.53	4.57	0.74	4.56	1.60	abstract	6	4	1	58
weapon	noun	-1.67	0.83	negative	5.18	1.36	4.04	1.68	3.87	0.83	6.12	1.21	concrete	6	5	2	24
weave	verb	0.06	0.40	neutral	1.68	1.06	2.62	1.68	4.84	0.85	4.12	1.72	abstract	5	3	1	2
welcome	verb, adjective	1.39	0.86	positive	2.59	1.40	5.40	1.35	3.40	0.80	3.54	1.72	abstract	7	6	2	33
whisper	verb, noun	0.09	0.67	neutral	2.43	1.56	4.63	1.64	3.04	0.91	4.26	1.89	abstract	7	6	2	12
wine	noun	1.01	1.02	positive	3.59	1.71	6.20	1.01	4.17	0.86	6.55	0.93	concrete	4	3	1	73
winner	noun	1.91	0.82	positive	4.11	1.89	4.98	1.51	2.99	0.87	4.88	1.58	concrete	6	5	2	12
witness	verb, noun	-0.09	0.65	neutral	2.85	1.48	3.88	1.67	4.76	0.82	3.51	1.76	concrete	7	6	2	17
worried	adjective	-1.40	0.77	negative	4.29	1.58	5.62	1.10	3.70	0.90	3.24	1.41	abstract	7	5	2	47
worthless	adjective	-2.07	0.94	negative	4.06	1.69	3.73	1.48	4.90	0.83	2.20	1.08	abstract	9	6	2	5
worthwhile	adjective	1.46	0.85	positive	2.63	1.32	4.56	1.33	4.88	0.84	1.93	1.15	abstract	10	7	2	12
wound	noun, adjective	-1.45	0.82	negative	4.27	1.56	3.99	1.53	4.26	0.87	5.37	1.54	concrete	5	4	1	15
youth	noun	0.85	1.03	interm. positive	2.79	1.51	4.56	1.63	4.62	0.81	4.44	1.80	abstract	5	3	1	65

Appendix B. Pairs of antonyms from the SAWL.

SUGGESTIONS FOR ANTONYM PAIRS	
abundance, lack	exhausted, energised
acceptance, rejection	familiar, strange
accomplish, abandon	farewell, greeting
achievement, failure	father, mother
afraid, brave	fault, merit
agitated, relaxed	follower, leader
agreement, conflict	forget, remember
angel, devil	fortune, misfortune
angry, calm	fragrant, stinking
antagonist, hero	frustrated, fulfilled
appreciated, disregarded	give, take
arrest, release	happy, sad
ashamed, proud	hateful, lovable
astonished, prepared	healed, hurt
attack, defence	health, illness
attic, cellar	heaven, hell
bad, good	helpful, useless
benefit, harm	inspired, discouraged
betrayed, protected	interested, bored
boy, girl	invitation, rejection
build, destroy	lively, apathetic
capable, incapable	loser, winner
caring, indifferent	loss, profit
cheerful, depressed	matching, opposite
clearheaded, confused	misunderstood, understood
collective, individual	moon, sun
complaint, praise	motivated, uninterested
concentrated, distracted	ordinary, original
confident, unsure	parting, joining
cry, laugh	poverty, wealth
curious, uninterested	problem, solution
damage, repair	punished, rewarded
dangerous, safe	pupil, teacher
defeated, successful	return, leave
delighted, disappointed	scream, whisper
desert, forest	stressed, relaxed
distressed, calm	strong, weak
divorce, marriage	success, failure
dream, nightmare	suspicious, trusting
easy, tricky	terrified, bold
embarrassed, assured	tired, energised
encouraged, discouraged	toy, weapon
enemy, friend	trap, release
enthusiastic, apathetic	truth, lie
evening, morning	victim, witness
evil, good	worried, calm
excited, bored	worthless, worthwhile
excluded, welcome	

Appendix C. Definitions of affective and lexico-semantic word properties given in the rating task. Definitions of familiarity, age of acquisition and imageability were adapted from the Briston Norms (Stadthagen-Gonzales & Davis, 2006).

Valence

Words can evoke different feelings. Reading the word *love* might make you feel good, whereas *war* might make you feel bad. A word like *chair* does not usually evoke either feeling. In this task we want you to rate how positive or negative the words are to you. In the following list please rate each one as to the feeling that you experience when reading it. Simply tick a number according to a point scale from -3 to +3. -3 means that the word evokes very negative feelings, whereas +3 means that the word evokes very positive feeling; 0 represents neutral feelings.
If you do not know the meaning of a word, please tick the box "unknown word".
This is not a speed experiment. You have as much time as you want. Nevertheless, do not spend too much time on each word, but respond spontaneously and use your own judgement.

Arousal

Arousal refers to the intensity of an event, ranging from not stimulating to highly exciting or agitating. In this task we want you to rate how intense each word is to you. For example, a word like *rain* might evoke low arousal, whereas *tornado* might evoke much more arousal. In the following list please rate each word by simply ticking a number according to a point scale from 1 to 7. 1 means that the word evokes calm feelings, whereas 7 means that the word evokes exciting or agitating feelings.
If you do not know the meaning of a word, please tick the box "unknown word".
This is not a speed experiment. You have as much time as you want. Nevertheless, do not spend too much time on each word, but respond spontaneously and use your own judgement.

Familiarity

In this task we want to find out how often you have come in contact with certain words, how familiar they are to you. In the following list you have to rate how often you experienced a word by simply ticking a number according to a point scale from 1 to 7. 1 means that you have almost never experienced this word, whereas 7 means that you experience it all the time. For example, a word like *riddle* does not occur very often, whereas you might hear *joke* much more frequently. Words that are intermediate, of course, should be rated appropriately between the two extremes.

If you do not know the meaning of a word, please tick the box "unknown word".
This is not a speed experiment. You have as much time as you want. Nevertheless, do not spend too much time on each word, but respond spontaneously and use your own judgement.

Age of acquisition

Please indicate in years the age at which you learned each of the words on the list. An approximate age is good enough for this rating. By "learning a word" we mean the age at which you would have understood that word if somebody had used it in front of you, even if you did not use, read or write it at the time. You have probably learned the word *apple* as a little child, but a word like *avocado* as a teenager. Please choose one of the age ranges given below each word and tick it.
If you do not know the meaning of a word, please tick the box "unknown word".
This is not a speed experiment. You have as much time as you want. Nevertheless, do not spend too much time on each word, but respond spontaneously and use your own judgement.

Imageability

Words differ in their ability to evoke mental images of things and events. Some words evoke a sensory experience, such as a mental picture or sound, very quickly and easily, whereas others may do so only with difficulty or not at all. You can easily conjure up an image of *fingernail*, whereas it is much more difficult to imagine a word like *permission*. In the following list you should rate a list of words as to the ease or difficulty with which they evoke mental images. Your ratings will be made on a seven-point scale, where one is the low imagery end of the scale and seven is the high imagery end of the scale. Words that evoke mental images most readily for you should be given a rating of 7; words that evoke images with the greatest difficulty or not at all should be rated 1; words that are intermediate in ease or difficulty of imagery, of course, should be rated appropriately between the two extremes.
If you do not know the meaning of a word, please tick the box "unknown word".
This is not a speed experiment. You have as much time as you want. Nevertheless, do not spend too much time on each word, but respond spontaneously and use your own judgement.