Original Article

Affective Norms for 362 Persian Words

Mahdi Bagheri[1], Behrooz Dolatshahi[1*], Parvaneh Mohammadkhani[1], Elham Eskandari[2]

[1] Department of Clinical Psychology, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.
[2] Department of Clinical Child and Adolescent Psychology, Faculty of Education and Psychology, Shahid Beheshti University, Tehran, Iran

Corresponding author and reprints: Behrooz Dolatshahi. Department of Clinical Psychology, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.
Email: dolatshahee@yahoo.com

Abstract

  Background: During the past two decades, a great deal of research has been conducted on developing affective norms for words in various languages, showing that there is an urgent need to create such norms in Persian language, too. The present study intended to develop a set of 362 Persian words rated according to their emotional valence, arousal, imageability, and familiarity so as to prepare the ground for further research on emotional word processing. This was the first attempt to set affective norms for Persian words in the realm of emotion.

  Methods: Prior to the study, a multitude of words were selected from Persian dictionary and academic books in Persian literature. Secondly, three independent proficient experts in the Persian literature were asked to extract the suitable words from the list and to choose the best (defined as grammatically correct and most often used). The database normalization process was based on the ratings by a total of 88 participants using a 9-point Likert scale. Each participant evaluated about 120 words on four different scales.

  Results: There were significant relationships between affective dimensions and some psycholinguistic variables. Also, further analyses were carried out to investigate the possible relationship between different features of valences (positive, negative, and neutral) and other variables included in the dataset.

  Conclusion: These affective norms for Persian words create a useful and valid dataset which will provide researchers with applying standard verbal materials as well as materials applied in other languages, e.g. English, German, French, Spanish, Portuguese, Dutch, etc.

Introduction

Emotion has undoubtedly a significant impact on human cognition. Over the past decades, a large body of research has been carried out to identify the role of emotional and unemotional stimuli including visual (1), auditory (2), and verbal stimuli on behavioral and brain responses (3). Evidence suggests that the impact of words on emotional processing is of great importance. Some of the great advantages of words over pictures are the less complexity and variability of physical aspects of verbal stimuli in comparison to a wide range of complexity and diversity of visual stimuli.

Another advantage of words is that they are more likely to elucidate basic mental concepts using specific and concrete words of everyday life which are familiar for everyone (4), particularly in the experiments related to emotion such as Visual Dot Probe (VDP) task (5)

emotional Stroop test (6), the Attentional Blink paradigm (7), and Affective Simon Task (8).

Emotional words are generally characterized along with two basic dimensions of valence and arousal (9, 10), which is in agreement with Osgood et al.' work (11) on semantic factors of evaluation and activity. They referred to these concepts as two important affective dimensions for concept perception ends. Valence is related to the degree of pleasure one judges a situation ranging from negative to positive, whilst arousal is related to the degree of activation one feels facing a particular situation ranging from calming to exciting. Both these dimensions have been considered to be critical in the range of differences between emotional and neutral words (11-13).

In order to have a better understanding of the language role in emotion, another influential dimension which needs to be considered is imageability. A volume of research have showed that words' imageability exert a considerable influence over language processing (14-18), and over concrete or abstract processing of words (19).

Given the foregoing considerations, there has been a growing interest establishing affective norms for words in various languages including English (20, 21), German (22-25), Spanish (26), Finnish (27), European Portuguese (4), Dutch (3), French (28), Italian (29), and polish (30); therefore, an urgent need is felt to establish affective norms for Persian words, as well.

Methods

Prior to the study, a list of 566 words were gathered from Persian dictionary and academic books in Persian literature from the first to the ninth grades. Next, eight independent psychology experts in the field of emotion were invited to examine the words in terms of their emotional characteristics; in other words, these experts discussed the emotional ambiguity of these words and whether each word can

lead to different emotional states, for instance, the word "father" can evoke either positive or negative emotional states depending on the participants' backgrounds. As some words could be ambiguous, 151 words were excluded in the first place.

Then, three independent proficient experts in the Persian literature were asked to extract suitable words from the remaining list and to choose the best (defined as grammatically correct, most often used, and the best form of the word).

There were some agreements on omitting a variety of words, which are as follows: all the specialists were agreed on excluding 19 words (100% agreement) and two of the three specialists were unanimous (66.6% agreement) on excluding 34 words. In addition, there were discussions over several other cases as well. After a host of discussions, specialists decided to omit some words which were ambiguous and to alter some others. Finally, 53 words were omitted and 8 words were altered.

The list of 362 words was randomly divided into three sub-lists, each including about 120 words, in order for the participants to give more precise answers and also to reduce the effect of surrounding words. We prepared four Likert scales two of which (valence and arousal) were adapted from Lang, and the other two (imageability and familiarity) were adapted from the literature (14) for the purposes of the study. Each word could be rated on a 9-point Likert scale presented under each word, similar to other studies published in this field (22, 26, 31).

Besides, each Likert scale was introduced by giving an account of the dimension with some instances of the scale-end states. This was carried out to elucidate the meanings of the dimensions and to concentrate on intuitive tendency to explain emotional states as well as feelings on the dimensions including valence (as positive or negative). Firstly, the purposes of the research were explained to the participants. Then, they were asked to fill out a socio-demographic

questionnaire (e.g., age, sex, and field of study). The whole procedure took about 75 minutes. Although there was no time limit, participants were greatly encouraged to select their answers carefully and quickly. Furthermore, participants were told to consider their immediate apprehension and impression of the words. Each word in the data set was evaluated by 28 to 32 participants.

Participants were screened with the Beck Depression Inventory (32) so as to limit variance of the data; therefore, all the participants of the current study were non-depressed individual. A total of 21 chose to leave the study (e.g. they chose one answer for more than 5 times in a row, left out some scales, or completed the questionnaire in less than 15 minutes) or were excluded because they were not native Persian speakers. All the participants evaluated words on paper-and-pencil questionnaire in their classrooms in different departments of the two universities. The data was collected between October and December, 2015.

The present study was approved by the Ethics Committee at University of Social Welfare and Rehabilitation Sciences. Prior to starting the study, participants signed the written consent forms.

Data was screened and analyzed using Statistical Package for the Social Sciences (SPSS) software version 22. Regression analysis, Pearson correlation, One-way ANOVA, and Post hoc *Scheffé* were run to analyze the data.

Results

A total of 88 Iranian individuals (54 females, 34 males; mean age=23.28 years, SD=5.52) took part in the study. Participants were volunteer undergraduates (70.4%) and graduates (29.5%) of psychology, linguists, and other fields of science invited from two universities in Tehran.

Several analyses were carried out to investigate the features of words covered in the current dataset. Table 1 provides the results obtained from descriptive statistics for arousal, valence, imageability, and familiarity.

Regression analysis was used with emotional valence as an independent factor and arousal as the dependent factor. No significant correlation was found between valence and arousal. Standardized Coefficients were less than 0.001. Figure 1 presents the distribution of the 362 word ratings in the two-dimensional affective space. To investigate further relations between the arousal and valence ratings, the entire set of words was split into three groups: positive, neutral, and negative words.

Table 1. Descriptive statistics of affective norms

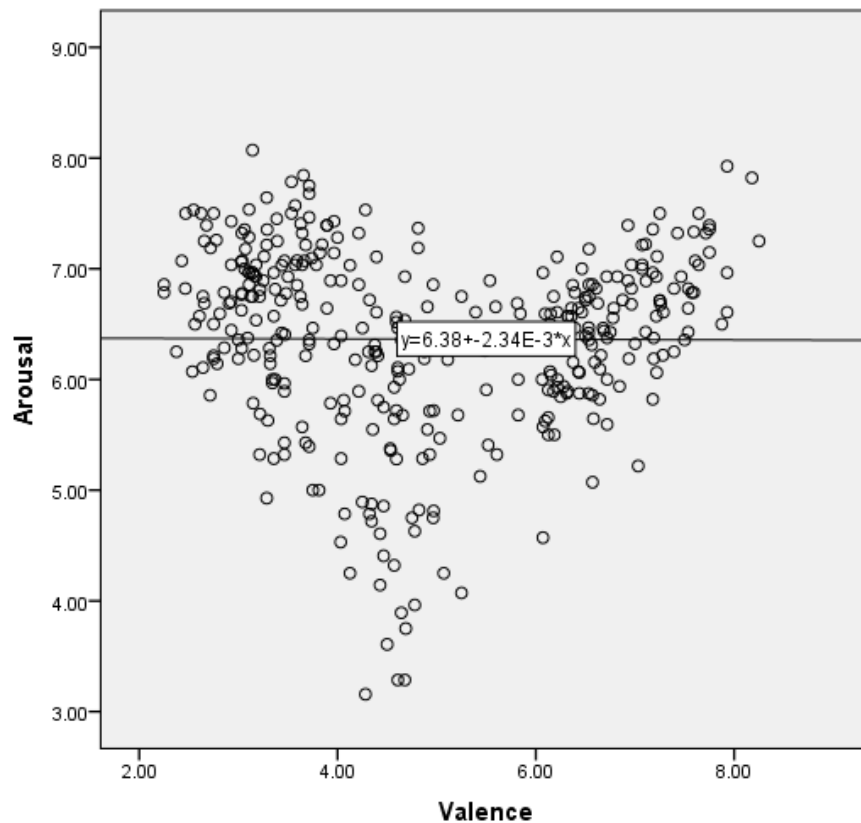|	Mean (SD)	Range	Minimum	Maximum
Valence	4.91 (1.60)	6.00	2.25	8.25
Arousal	6.36 (0.84)	4.92	3.16	8.07
Imageability	6.56 (0.59)	3.55	4.79	8.33
Familiarity	6.94 (0.43)	2.63	6	8.63
Length	4.62 (1.10)	6	2	8

Figure 1. Distribution of mean values for all of 362 words

The word valence division was done using the same criteria for the classification implemented by Ferre et al. (31) including: the mean valence ratings of the words between 1 and 3.99 were considered as positive (M=3.24, SD=0.41). Similarly, words with mean valence ratings between 4 and 6 were considered as neutral (M=4.68, SD=0.46) and words with mean valence ratings between 6.01 and 9 were considered as negative (M=6.81, SD=0.54). With respect to these criteria, our data included 134 positive (37% of the entire dataset), 99 neutral (27.3%), and 129 negative words (35.6%). Then, we decided to examine the relationship between valence and arousal ratings for the positive, neutral, and negative words, individually. The strongest correlation was found between valence and arousal for negative words, r(129)=0.56, *P*<0.001. As for positive words, no significant correlation was observed, r(134)=-0.03, *P*=0.66. As expected, no correlation was found for neutral words, r(99)=0.49, *P*=0.06.

One-way ANOVA was used to further analyze the features of positive, negative, and neutral words for different variables included in the dataset. As given in Table 2, the results revealed that the three groups had significant differences in valence, arousal, imageability, familiarity, and length. Post hoc *Scheffé* analysis demonstrated that the three sets of words were different in valence, arousal, and imageability. As for valence, all the differences between three sets were found to be significant (*P*<0.001). In arousal and imageability, significant differences were observed between positive and neutral, and also between negative and neutral (*P*<0.001), but no significant differences were found between positive and negative words for arousal (*P*=0.10) and imageability (*P*=0.18).

Table 2. One-way ANOVA among different dimensions in three groups of positive, negative, and neutral words

	F	*P*	η^2
Valence	1833.23	< 0.001	0.91
Arousal	57.17	< 0.001	0.24
Imageability	17.93	< 0.001	0.09
Familiarity	21.17	< 0.001	0.10
length	4.83	< 0.001	0.02

As far as the familiarity dimension is concerned, there were differences between positive and neutral words and between positive and negative words (*P*<0.001). Finally, with regard to the number of letters, just positive and neutral words were different (*P*=0.01).

Pearson correlations were conducted for the affective dimensions and the objective and subjective psycholinguistic variables. As mentioned earlier, we failed to observe a significant correlation between valence and arousal (r=-0.004, *P*=0.93). Also no significant correlation was found between valence and imageability (r=-0.04, *P*=0.39). Yet, a negative correlation was found between valence and familiarity (r=-0.20, *P*<0.001), and between valence and word length (r=-0.10, *P*=0.05), a positive correlation between arousal and imageability (r=0.50, *P*<0.001), between arousal and familiarity (r=0.43, *P*<0.001), as well as arousal and word length (r=0.17, *P*=0.001).

Discussion

The current study was intended to create an Iranian Affective Word List by collecting valence, arousal, imageability, and familiarity ratings for 362 words.

A large volume of research has already been carried out in the realm of emotions using word set considering either the two or three dimensional affective space model (9, 33). Similarly, the present study was conducted based on two dimensional model.

In contrast to some previous findings, no evidence was found to draw the general relationship between emotional valence and arousal. However, more detailed analyses revealed that negative and neutral words are considered to be more arousing than positive words. The relations between arousal and negative words seem to be consistent with other research in different languages (4, 23, 24, 26, 27, 31, 34-36) as well as for pictures (34, 37) and sounds (20, 26, 38).

Our results are in agreement with those of other studies revealing a relationship between affective and linguistic criteria. The strongest correlation between affective criteria and linguistic criteria was found between arousal and imageability. These results were similar to those reported by Citron et al. who showed that highly arousing words appeared to be more imageable (39). Arousing stimuli may pose a threat and require immediate response. These stimuli might be related to bitter experiences of early life which could lead to form a mental picture of the event. It is worth nothing that evaluating the imageability of a word requires sensory qualities that could be conceptualize out of context, while evaluating familiarity of words requires cognitive appraisal.

Positive words were found to be more familiar than negative words, which is in line with previous results reported in different studies (31, 35). This finding supports the idea that familiarity needs to be considered as a key factor in influencing

word processing (40-42). As a matter of fact, it has been suggested that some obstacles that come across in emotional Stroop tasks could be associated with the familiarity of the words, as the more familiar words are likely to produce higher interference (35). Thus, positive and negative words need to be matched in familiarity so as to avoid a confusing factor. The dataset in the present study included affective criteria and linguistic criteria for the stimulus words and an attempt was made to present a controlled Persian verbal source for future studies on emotional word processing. Finally, the current study made a valuable contribution to clinical and rehabilitation settings by providing a useful and valid dataset of Persian words to be used in therapeutic neuropsychological assessments, such as VDP and Stroop tasks.

Limitations and future directions

The generalizability of these results is subject to certain limitations. The major limitation of the current study was the small sample size of the participants; it is recommended that further research be undertaken using larger-scale replications. Another issue which makes these findings less generalizable is the participants. Since the data was obtained only from university students, it is suggested that future data be collected from participants in other settings. As previously stated, the current study was carried out to come up with a list of Persian words using Persian literature; it is worth bearing in mind that this list will be most effective when combined with Affective Norms for English Words (ANEW).

Conflicts of Interest

Authors declare no conflicts of interest.

References

1. Marchewka A, Zurawski L, Jednorog K, Grabowska A. The Nencki Affective Picture System (NAPS): introduction to a novel, standardized, wide-range, high-quality, realistic picture database. Behav Res Methods. 2014;46(2):596-610.
2. Belin P, Fillion-Bilodeau S, Gosselin F. The Montreal Affective Voices: a validated set of nonverbal affect bursts for research on auditory affective processing. Behav Res Methods. 2008;40(2):531-9.
3. Moors A, De Houwer J, Hermans D, Wanmaker S, van Schie K, Van Harmelen AL, et al. Norms of valence, arousal, dominance, and age of acquisition for 4,300 Dutch words. Behav Res Methods. 2013;45(1):169-77.
4. Soares AP, Comesana M, Pinheiro AP, Simoes A, Frade CS. The adaptation of the Affective Norms for English Words (ANEW) for European Portuguese. Behav Res Methods. 2012;44(1):256-69.
5. Yang W, Ding Z, Dai T, Peng F, Zhang JX. Attention Bias Modification training in individuals with depressive symptoms: A randomized controlled trial. J Behav Ther Exp Psychiatry. 2015;49(Pt A):101-11.
6. Sutton TM, Altarriba J. Emotion words in the mental lexicon: A new look at the emotional Stroop effect. Ment Lex. 2008;3(1):29-46.
7. Huang YM, Baddeley A, Young AW. Attentional capture by emotional stimuli is modulated by semantic processing. J Exp Psychol-Hum Percept Perform. 2008;34(2):328.
8. Ferré P, García T, Fraga I, Sánchez-Casas R, Molero M. Memory for emotional words in bilinguals: Do words have the same emotional intensity in the first and in the second language? Cogn Emot. 2010;24(5):760-85.
9. Russell JA. Core affect and the psychological construction of emotion. Psychol Rev. 2003;110(1):145-72.
10. Barrett LF, Russell JA. The structure of current affect controversies and emerging consensus. Curr Dir Psychol. 1999;8(1):10-4.
11. Osgood CE, Suci GJ, Tannenbaum PH. The measurement of meaning. 1957.
12. Kissler J, Assadollahi R, Herbert C. Emotional and semantic networks in visual word processing: insights from ERP studies. Prog Brain Res. 2006;156:147-83.
13. Russell JA. Culture and the categorization of emotions. Psychol Bull. 1991;110(3):426-50.
14. Kousta ST, Vigliocco G, Vinson DP, Andrews M, Del Campo E. The representation of abstract words: why emotion matters. J Exp Psychol Gen. 2011;140(1):14-34.
15. Huang HW, Lee CL, Federmeier KD. Imagine that! ERPs provide evidence for distinct hemispheric contributions to the processing of concrete and abstract concepts. Neuroimage. 2010;49(1):1116-23.
16. Altarriba J, Bauer LM, Benvenuto C. Concreteness, context availability, and imageability ratings and word associations for abstract, concrete, and emotion words. Behav Res Methods Instrum Comput. 1999;31(4):578-602.
17. Altarriba J, Bauer LM. The distinctiveness of emotion concepts: A comparison between emotion, abstract, and concrete words. Am J Psychol. 2004:389-410.

18. Kanske P, Kotz SA. Concreteness in emotional words: ERP evidence from a hemifield study. Brain Res. 2007;1148:138-48.

19. Vigliocco G, Vinson DP, Druks J, Barber H, Cappa SF. Nouns and verbs in the brain: a review of behavioural, electrophysiological, neuropsychological and imaging studies. Neurosci Biobehav Rev. 2011;35(3):407-26.

20. Bradley MM, Lang PJ. Affective norms for English words (ANEW): Instruction manual and affective ratings. Technical report C-1, the center for research in psychophysiology, University of Florida, 1999.

21. Stevenson RA, Mikels JA, James TW. Characterization of the affective norms for English words by discrete emotional categories. Behav Res Methods. 2007;39(4):1020-4.

22. Võ ML, Jacobs AM, Conrad M. Cross-validating the Berlin affective word list. Behav Res Methods. 2006;38(4):606-9.

23. Võ ML, Conrad M, Kuchinke L, Urton K, Hofmann MJ, Jacobs AM. The Berlin affective word list reloaded (BAWL-R). Behav Res Methods. 2009;41(2):534-8.

24. Kanske P, Kotz SA. Leipzig Affective Norms for German: a reliability study. Behav Res Methods. 2010;42(4):987-91.

25. Lahl O, Göritz AS, Pietrowsky R, Rosenberg J. Using the World-Wide Web to obtain large-scale word norms: 190,212 ratings on a set of 2,654 German nouns. Behav Res Methods. 2009;41(1):13-9.

26. Redondo J, Fraga I, Padron I, Comesana M. The Spanish adaptation of ANEW (affective norms for English words). Behav Res Methods. 2007;39(3):600-5.

27. Eilola TM, Havelka J. Affective norms for 210 British English and Finnish nouns. Behav Res Methods. 2010;42(1):134-40.

28. Monnier C, Syssau A. Affective norms for French words (FAN). Behav Res Methods. 2014;46(4):1128-37.

29. Montefinese M, Ambrosini E, Fairfield B, Mammarella N. The adaptation of the affective norms for English words (ANEW) for Italian. Behav Res Methods. 2014;46(3):887-903.

30. Imbir KK. Affective norms for 1,586 Polish words (ANPW): Duality-of-mind approach. Behav Res Methods. 2015;47(3):860-70.

31. Ferre P, Guasch M, Moldovan C, Sanchez-Casas R. Affective norms for 380 Spanish words belonging to three different semantic categories. Behav Res Methods. 2012;44(2):395-403.

32. Beck AT, Steer RA, Brown GK. Manual for the beck depression inventory-II. San Antonio, TX: Psychological Corporation. 1996;1:82.

33. Bradley MM, Lang PJ. Measuring emotion: Behavior, feeling, and physiology. Cognitive neuroscience of emotion. 2000;25:49-59.

34. Lang PJ, Bradley MM, Culthbert BN. International affective digitized sounds (IADS): Stimuli, instruction manual and affective ratings (Tech. Rep. No. B-2). The Center for Research in Psychophysiology, University of Florida, USA. 1999.

35. Dueñas CP, Acosta A, Megías JL, Castillo JL. Evaluación de las dimensiones de valencia, activación, frecuencia subjetiva de uso y relevancia para la ansiedad, la depresión y la ira de 238 sustantivos en una muestra universitaria. Psicológica. 2010;31(2):241-73.

36. Fraga I, Perea M, Redondo J, Vila MC. Estudio normativo del valor afectivo de 478 palabras españolas. Psicológica. 2005;26(2):317-26.

37. Moltó J, Montañés S, Gil RP, Segarra P, Verchili MC, Irún MP, Ramírez I, Hernández MA, Sánchez M, Fernández MC, Vila J. Un método para el estudio experimental de las emociones: el International Affective Picture System (IAPS). Adaptación española. Revista de psicología general y aplicada: Revista de la Federación Española de Asociaciones de Psicología. 1999;52(1):55-87.38.

38. Fernández-Abascal EG, Guerra P, Martínez F, Domínguez FJ, Egea DA, Martín MD, et al. El sistema internacional de sonidos afectivos (IADS): adaptación española. Psicothema. 2008;20(1):104-13.

39. Citron FM, Weekes BS, Ferstl EC. How are affective word ratings related to lexicosemantic properties? Evidence from the Sussex Affective Word List. Appl Psycholinguist. 2014;35(02):313-31.

40. Gernsbacher MA. Resolving 20 years of inconsistent interactions between lexical familiarity and orthography, concreteness, and polysemy. J Exp Psychol Gen. 1984;113(2):256.

41. Larsen RJ, Mercer KA, Balota DA. Lexical characteristics of words used in emotional Stroop experiments. Emotion. 2006;6(1):62.

42. Kousta ST, Vinson DP, Vigliocco G. Emotion words, regardless of polarity, have a processing advantage over neutral words. Cognition. 2009;112(3):473-81.