The lexicon of emotion in the neo-Latin languages

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23 April 2024

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Abstract. The article represents the conclusion of a wide-ranging European project concerning the emotion lexicon structure of Neo-Latin languages: Italian, French, Spanish, Catalan, Portuguese and Rumanian. The research project was intended to bring to light common features in these languages, as well as any peculiarities. Representative samples of emotional terms were selected from the dictionaries of the six languages studied. The similarity between these words was analyzed by Scaling procedures. The graphical outputs of the Scaling procedures seem to organize the Neo-Latin emotion lexicons in relation to three major dimensions that are similar to those already found in other languages: 'hedonic value', 'potency' and 'physiological activation'. Some interesting peculiarities emerged in relation to the salience of the dimensions, mainly for Rumanian and Portuguese.
Keywords: Communication --- Emotion --- Lexicon

Résumé. Ce travail représente la conclusion d'un ample projet européen concernant la structure du lexique émotionnel des langues néo-latines: italien, français, espagnol, catalan, portugais et roumain. Le but du projet de recherche était de mettre en évidence les caractéristiques communes à ces langues, ainsi que leurs particularités. Des échantillons représentatifs de termes émotionnels ont été sélectionnés dans des dictionnaires des six langues étudiées. La similarité parmi ces mots a été analysée à travers des procédures de Scaling. Les solutions graphiques des procédures de Scaling semblent organiser le lexique émotionnel néo-latin autour de trois dimensions majeures qui sont semblables à celles déjà trouvées pour d'autres langues: «valence hédonique», «puissance», et «activation

physiologique». Quelques particularités intéressantes ont été observées en ce qui concerne la

prépondérance des dimensions, en particulier pour le roumain et le portugais.

Mots-clé: Communication --- Émotion --- Lexique

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Information ISS

One of the traditional access routes to the emotions consists in studying the lexicon of

emotional terms, that is words with which the different forms of emotive and affective

experiences are identified, isolated and distinguished in the various human languages. The

first pioneering works were carried out on this subject in the Fifties (Nowlis & Nowlis,

1956), and interest heightened after the results that Osgood and his collaborators (Osgood,

1952; Osgood, Suci & Tannenbaum, 1957) obtained from their research into the semantic

structure of natural languages. Using the semantic differential, these authors demonstrated

that the principles which organize the significance of the words in natural languages may be

referred to three dimensions of an affective nature (Osgood, 1969): *evaluation,* which refers

to the level of pleasure or displeasure to which the words refer; *activity,* or the level of

physiological and behavioural activation which the words suggest implicitly or explicitly;

potency, which implies a semantic reference to the capacity of the person to tackle

environmental challenges. Another piece of work that opened the way to research on the

lexicon of emotions was conducted on the English language by Davitz (1969), who identified

four dimensions: activation or arousal, hedonic tone, competence, relatedness. The first three

correspond to the dimensions identified by Osgood, whereas the fourth refers to the quality of

the relationship with the environment and the persons which characterizes an emotional

experience.

A considerable amount of more recent research on the lexicon of the emotions used multidimensional *scaling* (MDS) procedures (Bush, 1973; Neufeld, 1975; Russell and Merhabian, 1977; Russell, 1978, 1980; Plutchick, 1980; Conte & Plutchick, 1981; Galati, 1986; Russell, Levicka & Niit, 1989; D'Urso & Galati, 1990; Gius, Cozzi & Spagnotto, 1992; Zammuner, 1998). According to Russell, the results of the studies he conducted on the English lexicon of the emotions using the RMDS (**Replicated MultiDimensional Scaling)** substantially identified the three dimensions proposed by Osgood, that is the axis of evaluation, or of pleasure/displeasure (*evaluation*), that of physiological activation (*arousal*) and that of control of the situation (*potency*) (Russell, 1980, 1991). However based on his most recent studies, he maintained that there seem to be only two principal dimensions of emotional lexicon: *valence* and *arousal* (Feldman Barrett & Russell, 1998; Russell & Feldman Barrett, 1999; Feldman Barrett & Fossum, 2001). In general, bearing in mind the various research projects in which it is used, this model attributes an almost circular arrangement to the semantic space of emotive words, where similar words are close to each other (contiguity principle) and those with a very different meaning are placed at polar opposites (polarity principle). A certain discontinuity can be noted in the circular arrangement of the words because high-density areas, characterized by a greater number of words, alternate with areas of low density, thus forming groups of clearly identifiable terms of similar significance. The semantic groups that are most frequently identified in the various works on emotive lexicons generally correspond to the main families of basic emotions such as anger, joy, surprise, fear and sadness.

In most cases, the results that have been summarized and discussed thus far refer to research conducted on the Anglo-American language, or on other languages having used the translation of English terms for the comparative analysis, without a preliminary analysis of the lexicons having been carried out on the languages studied in order to find the emotional

terms that are most typical of each language (Russel, 1983; Russell, Levicka & Niit, 1989).

Therefore, for this reason, they cannot be considered definitive and valid for all languages. In

order to arrive at more general conclusions, research must be developed transculturally. Other

research on Indonesian (Shaver, Murdaya & Fraley, 2001) or Filipino (Church et al., 1998)

lexicons of emotions has avoided these methodological limitations by directly analyzing the

lexicons of certain languages other than English, obtaining results that were not wholly in

agreement with those already available in the literature. Other studies have been conducted

on Italian, also by using a sample batch of terms that is representative of the lexicon being

examined. (Galati, 1986; D'Urso & Galati, 1990; Gius, Cozzi & Spagnotto, 1992). These

studies confirmed the importance and the priority of the *hedonic valence* axis in the

organisation of the structure of the emotional lexicon, but the *potency* axis proved to be more

important than the *arousal* axis. Fillenbaum and Rapaport (1971) applied the

multidimensional scaling to 15 Hebrew emotional words, finding that *pleasure/displeasure*

was the only interpretable dimension; a similar result was found in Japanese by analyzing 35

terms (Yoshida et al., 1970). In a study conducted by applying the MDS on 235 German

emotional words, Gehm and Scherer (1988) found that the two fundamental dimensions

were, in order, *pleasure/displeasure* and *dominance* (assimilable to potency). When

analyzing the same German lexicon and applying a factor analysis, Abele-Brehm and Brehm

(1986), on the other hand, found that the two fundamental dimensions were, in order,

pleasure/displeasure and *arousal*. All three of the dimensions of *pleasure*, *arousal* and

dominance respectively were found by Corraliza (1987) by applying a factor analysis to

Spanish emotion-related terms.

To summarize: the only dimension found in all the lexicons studied was *hedonic* valence.

Potency emerged as the second organizer of meaning, while in others it was the dimension of

arousal. What was surprising was that different studies on the same languages could give

different results when conducted using different methodologies. Taken together the results discussed above are not wholly in agreement, and we therefore feel it is premature to conclude that there is a universal structure of the lexicons of the emotions characterized by the same dimensions which have the same importance order in all languages. Even the differences found thus far cannot be considered as being certain, bearing in mind that they were brought to light using different methodologies that were not always comparable. Further studies should therefore be developed. A more systematic method of study would certainly enable us to reach more certain conclusions as well as yield new information that is not available today.

Aims and hypotheses

Starting from the above considerations, a coordinated European research project has been organized with the main aim of comparing the dimensional structure of the emotional lexicons of the six principal Neo-Latin languages: Italian, French, Spanish, Catalan, Portuguese and Rumanian. In order to make the results comparable, the same methodology has been used in analyzing the six languages. The authors chose the Neo-Latin languages because, along with the Anglo-Saxon languages, they are the ones most spoken in the Western world. Moreover contrary to the English language, the few studies that have been conducted on them have been done in a non-systematic way.

Method

The lexical *corpora* were put together in a coordinated fashion using the same inclusion criteria for terms. Data analysis was also performed in a coordinated fashion using the same analysis procedures.

The research was subdivided into the following two parts: a first phase in which emotional terms were selected so as to identify the words commonly used to describe emotions by speakers in each of the six linguistic contexts investigated; a second phase in which the terms were evaluated subjectively. The second phase used a method aimed at measuring the reciprocal similarities among the terms of each of the six emotional lexicons; it aimed to point up and compare the semantic structures of the different lexicons.

Phase 1: Selection of emotional terms.

The corpus of emotional terms to be judged was chosen in three different steps, which involved only native speakers of the language in question who were entirely outside the purposes of the research. The method by which the lexical corpus was selected was as follows.

In the first step, three people of university culture, experts in the field of linguistics, were asked to select, from the most up-to-date and complete dictionary of their mother tongue, all the adjectives that had a clearly emotional meaning. Adjectives were chosen because it appears that they are more easily associated with immediate emotional experience (Plutchik, 1980) than nouns, which refer to an abstract store of representations separated from any contextual element (Conway & Bekerian, 1987). Furthermore the choice of only adjectives avoided the multiplication of terms referring to the same emotion, which can be expressed in a nominal, verbal and adverbial form. Only when there was no adjective form in

a particular language to express a certain emotion were the morphological forms used in that language to express that particular emotion accepted as an alternative.

Considering the semantic ambiguity of emotional terms, the participants were provided with common criteria of choice derived from Ortony, Clore and Foss (1987). In order to make them more general and bring them in line with the main opinions now common among emotion psychologists, the criteria were reformulated as follows: (1) the terms should refer to internal and mental conditions; (2) they should describe a momentary state; (3) they should refer mainly to affective aspects, even though they might also imply other aspects related to emotional knowledge, emotional behaviour, physiological changes and expressive aspects of emotions.

All these criteria were explained in very simple words, and it was verified that they had been understood. The words on which the whole panel agreed were included. In order to make it easier to compare the six lists compiled in this first stage of selection, we introduced a further selection criterion in the second stage of the selection, with the aim of identifying more restricted groups of terms, as typical as possible, for each language.

In the second selection step, another panel of a further six native speakers for each language, three men and three women, of university culture but not linguistic experts, were asked to select from the first six lists only those terms which in their opinion had a clear and typical emotional meaning, using the same inclusion criteria described above. The terms considered to be emotional by at least four panel members out of six were then retained. In this way six new lists of terms were obtained in which the differences in number were reduced, although not completely (83 terms for Italian; 111 for French; 86 for Castilian, 109 for Catalan; 141 for Portuguese and 94 for Rumanian). Despite the use of common semantic criteria for the selection of the emotional terms, the three lists ended up with different numbers of words. This could **be explained by** an actual difference in the number of

emotional terms available in the different languages or by a different interpretation (more restricted or wider) of the semantic criteria proposed by the various selectors.

The objective of the third phase of the selection process was to make the six lists of terms more comparable, sacrificing any differences in number in the lists selected in the previous phases. To this end, it was decided to carry out a further selection, establishing *a priori* a limit of 32 terms for each language. In order to obtain these lists, an additional panel of judges, made up of six native speakers for each language, three men and three women, of university culture, who were not linguistic experts in this case either, were asked to select the 32 most typical emotional terms from each of the previous lists. The terms chosen as the most typical by at least four out of the six panel members were retained. In the event that the number of terms accepted in this way did not add up to the total of 32, all the judges were told the words on which four persons out of six had not reached agreement, and they were asked to agree on more terms in order to reach the limit of 32 terms to be included in the definitive list (Table 1).

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Insert Table 1 about here

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In this way the fact of having imposed a threshold on the selectors, thereby limiting their freedom of choice, did not create an excessive bias because it allowed a list to emerge for each language, which implied the 32 most typical words. Moreover any bias could be controlled by the fact that two different analyses would be conducted on the two lists of different lengths resulting from the two different processes for selecting the terms.

Phase 2: The reciprocal comparison judgements

The similarity among the selected words was evaluated by a group of thirty mother-tongue university students for each of the six languages and was carried out on the 32 terms resulting from the last selection explained above. The participants were recruited at the universities of the countries in which the languages under investigation are spoken. Half of the participants were men and half were women; all were between the ages of 20 and 50, with a middle-to-higher level of education. Each participant was asked to evaluate the reciprocal similarity among all 32 terms selected for this analysis. The participants were invited to express an evaluation of reciprocal similarity between all possible pairs of words, using a double-entry table. The evaluations were formulated using a seven-point Likert scale, which went from maximum similarity, scored +3 (terms with identical meaning), to minimum similarity, scored –3 (terms with opposite meanings). Similarity evaluations were thus formulated on all possible pairs of words, without using reference words. Since this task was laborious, it was completed in more than one session (generally three) to avoid fatigue playing a negative role. Furthermore to avoid the bias of the list effect we changed the presentation order of terms for each participant.

In order to ensure the opinions expressed by the judges could be compared, and to eliminate as much as possible the effects due to different uses they might make of the similarity scale, the scores referring to each judge have been ipsatized (cf. Russell & Pratt, 1980). It means that the raw scores of each judge (every individual matrix of similarity evaluations) have been transformed removing judge's mean and variance computed on all his evaluations. Each individual matrices of ipsatized scores obtained in this manner are characterized by having equal mean and equal variance and can be compared to each other. For each lexicon a matrix which contains the arithmetic mean of individual ipsatized evaluation of pair of words has

been produced. The Classical MultiDimensional Scaling (CMDS) procedures were carried out on the above data ipsatized in this way.

Results

The similarity scores were transformed into distance scores as requested by the Classical Multidimensional Scaling technique (ALSCAL procedure of SPSS) used in the analyses. The CMDS-analysis was made on the average matrix per language. A three-dimensional solution was chosen in all of the six languages for the following reasons: (a) moving from a bi-dimensional to a tri-dimensional solution improved the fit measures, that is R^2 and Stress value (Kruskal's –1 formula.), noteworthy; (b) fit values of the three-dimensional solution seemed **to be acceptable if the large number of stimuli (32) were taken into account**; (c) the addition of a fourth dimension did not increase the fit in a substantial way.**[1]**

Two common dimensions have been found in all six languages. One of them can be labelled 'hedonic valence' because it is identified by the contraposition of terms referring to the positive/negative emotions. In Italian: *felice*/*infelice* and *addolorato*; in French: *heureux*/*mecontent* and *contrarié*; in Castilian: *euforico* and *contento*/*abatido* and *triste*; in Catalan: *alegre* and *content*/*amargat* and *frustrat*; in Portuguese: *contente* and *alegre*/*infeliz*; lastly in Rumanian: *entuziasmat* and *bucuros*/*indurerat* and *trist*.

The other common dimension can be labelled 'physiological activation' since it was identified by the contraposition of terms of low and high activation. In Italian: *annoiato* (bored) and *sbalordito* (astounded); in French, *agité* and *excité* (excited)/*accablé* and *désolé* (**dejected/sorry**); in Castilian, *enfurecido* and *furioso* (furious)/*calmado* (calm); in Catalan, *enrabiat* and *empipat* (angry, annoyed)/*moix* and *nostalgic* (dejected, nostalgic); in

Portuguese, *agitado* and *agressivo* (agitated and aggressive)/*calmo* and *acanhado* (calm and embarassed); in Rumanian *infuriat* (furious)/*melancolic* (melancholy).

The last dimension identified is not the same for the six languages: It can be referred back to 'potency' in Italian, French and Rumanian, and to a mixture of potency and activation in Castilian and Catalan, while it can be referred back to the evaluation of the 'behaviour adequacy to one's own inner norms' in Portuguese. More specifically the contrapositions characterizing the 'potency' dimension are: in Italian, *indignato*, *disgustato* and *irritato* (approximately indignant, disgusted and irritated)/*ansioso*, *pauroso* and *spaventato* (anxious, afraid and frightened); in French, *fâché* (angry)/*effrayé* (frightened); in Rumanian: *aprins*, *enervat* and *entuziasmat* (heated, angry and enthusiastic)/*incremenit* and *buimacit* (both meaning astounded, disoriented).

The contrapositions characterizing the last dimension found in Castilian and Catalan are: in Castilian, *abochornado* (ashamed)/ *aterrorizado* and *asustado* (**terrified** and frightened); in Catalan, *trist* and *melancolic* (sad and melancholy)/*atemorit* and *horrorit* (frightened and **terrified**). This makes us think **that negative emotions are differentiated among themselves, according to the potency level, which can be associated with the action tendency of behavioural activation** (fear) vs. action arrest (sadness or shame).

Finally in Portuguese the contrapositions characterizing the 'behaviour adequacy to one's own inner norms' dimension are: *orgulhoso* (proud)/*envergonhado* (ashamed).

The third dimension in all languages seems to refer to different strategies of coping.

Generalized Procrustes Analysis (GPA) was applied to the six CMDS solutions with the aim of testing the congruence of the tri-dimensional configurations obtained, the reliability and comparability of the results and the salience of the different dimensions. We used the Pindis algorithm (Lingoes & Borg, 1978) as implemented in NewMdsx (Coxon,

Brier & Hawkins, 2005) as it allowed for a hierarchy of models for assessing individual

differences (in this case language).

In order to carry out this verification, a limited common base of emotional terms with

similar meaning was identified in the six languages. We chose to take a sample representing

twenty-five percent of the 32 words in each of the six lists (eight terms).**[2]**

Starting from the six three-dimensional configurations of the eight terms of the

CMDS, a centroid configuration was obtained from the GPA. The three dimensions that

emerged can clearly be labelled respectively: 'hedonic valence' (characterized by the

opposition between happiness and sadness), 'potency' (characterized by the opposition

between anger and fear) and 'physiological activation' (characterized by the opposition

between anger and fear, on the one hand, and sadness, on the other) (Figures 1 and 2).

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Insert Figure 1 about here

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Insert Figure 2 about here

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The similarity of each of the individual configurations to the centroid was not so

great because the R^2 values range from 0.70 (Portuguese) to 0.83 (Castilian). In order to

improve the fit, we decided to move from the ordinary GPA to the dimensional salience

model.

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Insert Table 2 about here

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This model showed very high fitness values in relation to the six configurations

(Table 2) and allowed interesting differences among the languages to emerge. In all six of the

languages, the most important dimension (the one with the highest relative weight) is 'hedonic valence'. In Italian, Catalan, Castilian and French, the second dimension is 'potency', even though there is little difference between 'potency' and 'physiological activation' in French. In Rumanian, and especially in Portuguese, 'physiological activation' is relatively more important than 'potency'.

Therefore, even if we restricted our analysis to the eight terms with good translatability from one language to another, we found that the salience of the second and third dimensions were not the same in all the languages. Furthermore Rumanian and Portuguese still showed some kinds of specificity related to the lower value of fit measure. This may indicate a greater distance between these two languages and the others.

Discussion and conclusions

From the CMDS results, it emerges that three dimensions are sufficient to organize the meaning of the emotional lexicons of the six Neo-Latin languages analyzed. Some differences emerged in labelling these dimensions, except for the first, 'hedonic value', which was constant in all languages. The other two dimensions referred to the specific modality face with environmental challenges or to the somatic and physiologic changes associated with the different emotions. **If the verbal markers of the coping dimensions are taken into account, results revealed some cultural-specific aspects.** In Italian, French and Rumanian, the coping dimension is characterized by the opposition between anger and fear, while that of activation is characterized by the opposition between anger and fear, on the one hand, and rest behaviour, on the other hand. In Castilian and Catalan, in one dimension, escape emotional reactions are opposed to rest behaviour and, in the other, aggressive reactions are

opposed to rest behaviour. This seems to **indicate** that people speaking these languages organize the emotional meaning by considering the activation and coping dimensions together, but distinguish between active aggressive reactions and active escape behaviour. In Portuguese the dimension referred to coping implies mainly **an assessment** of the outcomes of coping behaviour and, more specifically, of the adequacy of this behaviour to one's own inner norms, contrasting good performances (pride) with bad performances (shame).

Clearer polar oppositions between the terms identifying the three dimensions emerged from the syntetical GPA analysis, in which the data referring to all six languages are considered together. **The oppositions are the following: happy and content vs. sad and desperate; angry and irritated vs. frightened; content and sad vs. angry, frightened and irritated.** The meaning of the three dimensions emerging from these oppositions **can be defined** more concisely trac**ing them** to the classical three dimensions proposed by Osgood (1969): *evaluation*, *potency* and *activity*. In conclusion we can generalize this result by arguing that the most suitable model to represent the structure of emotional lexicons of natural languages seems to be three dimensional and not two dimensional, as claimed by Russell and his collaborators (Russell & Feldman Barrett, 1999), or four dimensional as proposed by other authors, such as Davitz (1969). In this model, the *potency* dimension plays a substantial and not merely auxiliary role in organizing the meaning of emotional words.

Nevertheless, considering our results, it emerges that the relative salience of the *potency* and *activation* dimensions can vary among different natural languages. In our study, even though *evaluation* is always the first dimension, the other two dimensions have different salience in the six languages. In Italian, French, Catalan and Castilian, the second dimension is *potency*, followed by *activation*, confirming previous results obtained for the Italian lexicon (Galati, 1986; D'Urso & Galati, 1990). Alternatively, in Rumanian and Portuguese, the second dimension is *activation* and the third is *potency*.

The potency dimension prevails in Italian, Catalan, Castilian and French probably because the countries in which they are spoken are geographically collocated in the core of the Neo-Latin linguistic area at a minor distance from the geographical and historical centre of the spread of Latin.

This result could be explained in historical-cultural terms, bearing in mind that the core of Neo-Latin culture is inherited from a centuries-old rationalist tradition of Latin and Greek derivation, due to which the logical-cognitive aspects of mental activity have always enjoyed privileged attention. For this reason, the procedures for attributing significance to the emotional words in these four Neo-Latin languages may pay more attention to their aspects of cognitive evaluation, which are implicit in the 'potency' dimension, and less to the somatic aspects linked to the 'physiological activation' dimension. This is naturally only an interpretive hypothesis, and more in-depth studies would be necessary to demonstrate it properly.

I propose we list the publications all at the end of the bios, since the same authors feature in several articles, but not all of these are listed under the respective authors .

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Notes

1. Minimum, maximum and average R^2 and Stress values obtained in the six languages.

	Stress			R^2		
Dimensions	Min.	Max.	Mean	Min.	Max.	Mean
2	0.226	0.276	0.250	0.654	0.822	0.740
3	0.143	0.168	0.152	0.825	0.903	0.860
4	0.100	0.123	0.111	0.885	0.929	0.906

2. Five bilingual judges were given the task of choosing the terms, each judge having perfect knowledge of Italian and one of the other five languages being analyzed. Each of these judges was asked to identify the words which were the easiest to translate in the two lists of 32 terms, that is those with a meaning that was at least very similar if not identical. The judgement of the translatability from one language to the other was to be formulated on a scale with five point intervals, ranging from easy to translate to impossible to translate. Finally the eight terms were chosen for which the average scores of translatability were the highest, that is more than five, in all six languages.

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Table 1

Thirty-two emotion terms selected by judges for the subjective judgements procedure

in each language

| Italian	French	Castilian	Catalan	Portuguese	Rumanian
addolorato	accablé	abatido	acollonit	acanhado	abătut
allegro	agité	abochornado	alegre	aflito	aprins
angosciato	angoissé	acongojado	amargat	agitado	bucuros
annoiato	anxieux	angustiado	angoixat	agressivo	buimăcit
ansioso	bouleversé	animado	animat	alegre	decepţionat
arrabbiato	calme	ansioso	ansiós	apaixonado	demoralizat
contento	content	apesadumbrado	atemorit	arrependido	deprimat
depresso	contrarié	asustado	avergonyit	calmo	disperat
disgustato	découragé	aterrorizado	content	chateado	dor
disperato	déçu	calmado	deprimit	ciumento	îndurerat
divertito	dégoûté	compungido	desesperat	contente	enervat
entusiasta	déprimé	consternado	divertit	culpado	entuziasmat
euforico	désesperé	contento	empipat	desanimado	fericit
felice	désolé	desconsolado	emprenyat	desconsolado	îngrozit
gioioso	effrayé	desdichado	enfadat	desgostoso	încordat
imbarazzato	embarrassé	desesperado	engelosit	encantado	incremenit
impaurito	en colère	desgraciado	enrabiat	envergonhado	infuriat
indignato	énervé	desolado	enutjat	espantado	ingrozit
infelice	étonné	disgustado	enyorat	excitado	melancolic
irritato	excité	emocionado	estar mosca	feliz	mirat
malinconico	fâché	encolerizado	eufòric	furioso	neliniştit
meravigliato	furieux	enfervorizado	feliç	impaciente	nervos
preoccupato	gêné	enfurecido	frustat	infeliz	nostalgic
risentito	heureux	eufòrico	horroritzat	magoado	plăcere
sbalordito	inquiet	exaltado	indignat	medo	ruşine
scontento	joyeux	excitado	irritat	nervoso	încurcat
sconvolto	mécontent	feliz	melancòlic	orgulhoso	speriat
sereno	nerveux	furioso	moix	preocupado	supărat
sorpreso	ravi	infeliz	nostàlgic	satisfeito	trist
spaventato	surpris	irritado	perplex	saudoso	tulburat
stupito	tranquille	rabioso	rabiós	triste	uluit
triste	triste	triste	trist	zangado	zbuciumat

Figure captions

Figure 1. GPA centroid solution (first and second dimensions)

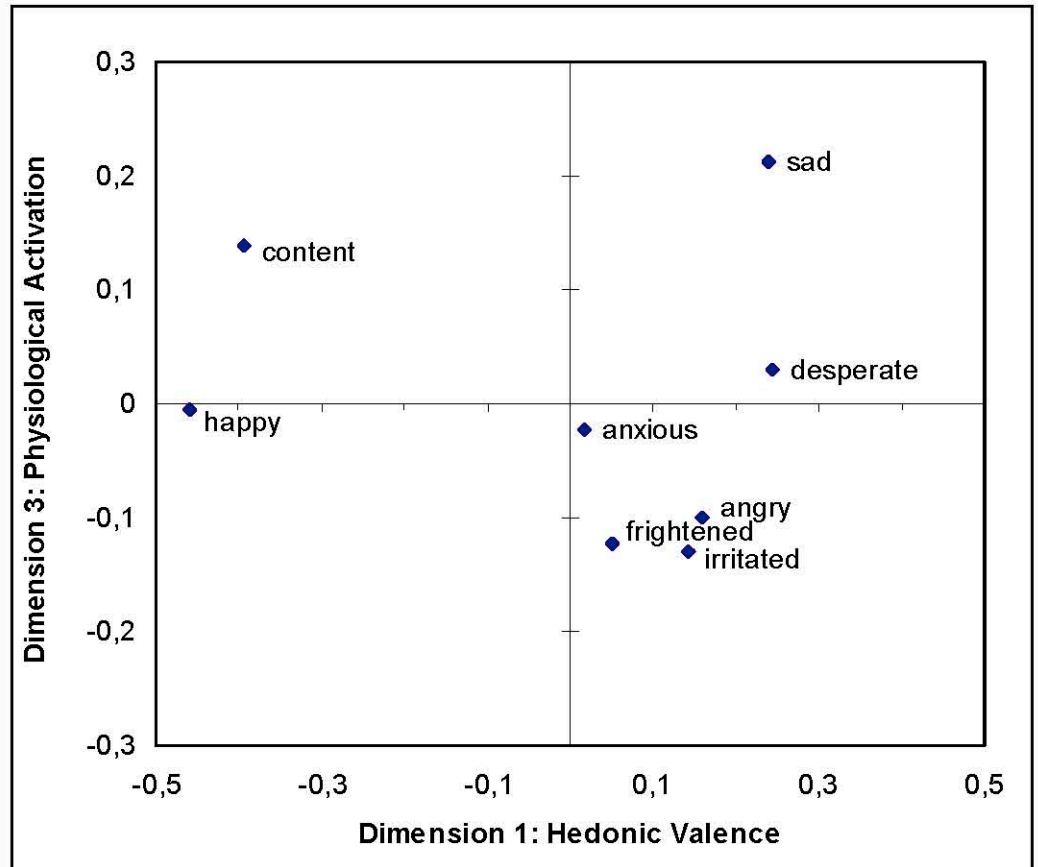*Figure 2*. GPA centroid solution (first and third dimensions)

Figure 1
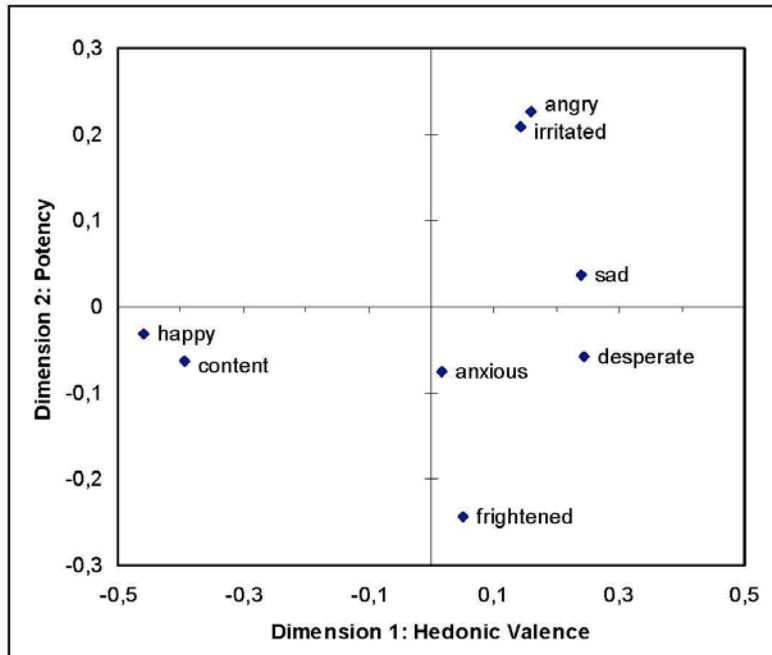
Table 2

Fit values and dimension weights in relation to the six languages configurations

| Language | R^2 | Normalized weights | | |
		hedonic valence	potency	physiological activation
Italian	0.94	0.77	0.53	0.26
French	0.92	0.75	0.45	0.41
Catalan	0.95	0.74	0.55	0.30
Castilian	0.94	0.80	0.43	0.33
Rumanian	0.87	0.85	0.25	0.30
Portuguese	0.83	0.85	0.17	0.28