Evolution of Gender in Indo-European Languages

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Abstract

In a recent paper, Lera Boroditsky and Lauren A. Schmidt (2000) examined the degree to which the linguistic category of grammatical gender of nouns influences people's perception of the cognitive category of biological gender, or sex. Their conclusion was that English speakers' intuitions about the gender of certain nouns (animals) correlate with the gender assigned to those nouns in languages such as German and Spanish. More important, they found that people's ideas about the putative biological gender (sex) of objects are strongly influenced by the grammatical gender of those objects in their native language. In this study I sought to reproduce Boroditsky and Schmidt's results in order to show that the interpretation they supplied is unwarranted, and that the authors conflate the concepts of biological gender (sex) and "formal gender", which is employed by most Indo-European languages (as opposed to "natural gender", in English). I compare the intuitions of 20 American monolinguals with the statistics of formal gender as it appears in 14 Indo-European languages. Moreover, I discuss the possible origin and evolution of gender in such languages, and suggest an explanation for the relation between grammatical and biological gender.

Introduction

The idea that our native language may shape our thought, in part or in whole, is usually associated with the work of Whorf and Sapir, in what is known as "the Sapir-Whorf hypothesis" (Whorf, 1956). This is an intriguing hypothesis because it implies that different cultures — speaking different languages — may perceive the world in different ways. For example, whereas one culture may differentiate objects on the basis of shape, another culture may differentiate them on the basis of material (Imai and Gentner, 1997), and this may be reflected in the corresponding languages. To what extent, then, does language (and culture) force a person's cognition to perceive the world in one way rather than another?

A possible manifestation of this idea was examined by Boroditsky and Schmidt (henceforth B&S), in studying the way grammatical and biological gender interfere with each other in the minds of native speakers of languages such as Spanish and German. B&S support the idea that a speaker whose language assigns the genders masculine and feminine to nouns — whether they refer to people, animals, things, or ideas — is bound to subliminally think of an object as having a corresponding biological gender, male or female. (To avoid circumlocutions, I use the word "sex" to refer to biological gender, reserving "gender" for the grammatical category.)

B&S's proposal rests on the assumption that there is an inherent equating of the concepts of gender and sex in such a speaker's mind. So, for example, a young learner of an Indo-European language employing "formal gender" could associate a specific category of nouns discernible only through the behavior of neighboring words (say, the feminine nouns) with a perceptual property of entities of the world (say, the femaleness of individuals), even before encountering the words for "feminine" and "masculine". Although the latter point to a certain relation between gender and sex (which undoubtedly exists), we will see that such an assumption is untenable. First, however, we should briefly review the category of gender as it appears in various languages, in order to understand what it is, and what relation we may expect between the concepts of gender and sex.

Although many people are familiar with gender as it appears in Indo-European languages, the notion of gender as understood by linguists is much more general. As a "definition", I will follow Charles F. Hockett's description: "Genders are classes of nouns reflected in the behavior of associated words" (Hockett, 1958:231). A characterization like this is general enough to encompass all noun categories that linguists call "genders", whether they are labeled "masculine", "feminine", "neuter", "common", or even "class IV".

A language may have two or more classes of nouns that qualify as genders, or it may have none, in which case we say that the language lacks a gender system. Such is the case with several of the major families of Asian languages (e.g., Mandarin Chinese). Tamil, a member of the Dravidian family in south India, divides nouns into "rational" (i.e., people, gods) and "non-rational" (animals, and everything else), and further subdivides rational gender into "masculine" and "feminine" (Corbett, 1991:8–10). Thus, Tamil employs a "natural gender system", which means that given the semantics of a noun we can predict its gender, and vice-versa. English, a Germanic language, has a natural

gender system like Tamil, reflected only in personal, possessive, and reflexive pronouns. There are a few exceptions to semantic association: "she" may be used for a ship or country, "he"/"she" for an animal (of unknown sex), and "it" for downgrading humans (Mathiot and Roberts, 1979). Other languages show a less well-defined assignment based on semantics: Zande, a language spoken mainly in the Democratic Republic of the Congo, assigns nouns generally to four genders: masculine, feminine, animal, and neuter (Corbett, 1991:14). There are, however, about 80 exceptions, including such concepts as heavenly and metal objects, and edible plants, which are placed in the animal gender. Dyirbal, an Australian language, also has four genders, denoted by "class I, II, III, and IV". It has been shown (Dixon, 1972:308–12) that male humans and non-human animates belong to class I; female humans, water, fire, and fighting to class II; non-flesh food to class III; and everything else to class IV. Thus, the rules are semantic but non-obvious. However, children learning the language do not appear to learn the gender of nouns individually.

Turning now to typical Indo-European languages, we see an even smaller dependence on semantics. Nouns denoting people — assigned to masculine or feminine gender according to sex — are a minority. The "exceptions" (non-sexed objects assigned to either of those two genders) are the majority, thus making the semantic association a rather useless predictor for the gender of a noun. This fact, as we shall see, is very important for a correct assessment of B&S's work.

B&S's Experiment 1

In their first experiment, B&S investigated whether "the grammatical genders of nouns do in part reflect the properties of their referents" (Boroditsky and Schmidt, 2000:2). If true, they predicted "a correspondence in the assignment of genders across languages, and also a correspondence between Spanish and German genders and English speakers' naive intuitions". Although their testing of the prediction of correspondence across languages was rather inadequate (regarding the number of languages; I improve this test in the present study), they did a more thorough test of the naïve intuitions of 15 English speakers, none of whom were familiar with either Spanish or German (though we do not know if they were monolinguals). The subjects were asked to exclusively classify each of 50 animal names and 85 names of artifacts as either masculine or feminine (B&S do not give a list of those words).

Their comparison of gender agreement between Spanish and German yielded a correlation coefficient of $r = 0.21$, $p < 0.05$. This, they termed an "appreciable agreement". Although I would think a value of $r = 0.21$ (hence, $r^2 = 0.04$) indicates a rather appreciable *dis*agreement, B&S pointed out that the two languages "agreed more on the genders of animals (r=.39, p<.01), [than] on the genders of artifacts (r=.10, p<.35)".

To test B&S's hypothesis on the agreement of gender across languages, I examined 84 common nouns in 14 Indo-European languages. The nouns were chosen so that they represented more-or-less common referents: 20 artifacts, 22 natural objects, 20 abstract ideas, and 22 animals. The 14 languages were chosen so that a fairly representative set of the Indo-European family tree was obtained (three Germanic: Dutch, German, Icelandic; four Romance: French, Italian, Spanish, Portuguese; three Slavic: Polish, Russian, Serbo-Croatian; one Celtic: Irish; and also Albanian, Greek, and Kurdish.) Native speakers verified my choices of nouns (originally collected from dictionaries) for all languages but Albanian, Dutch, and Icelandic. The full assignment of genders is given in Appendix A.

The results of my study show that, predictably, the closer languages are in the family tree, the more they agree on gender. Languages as close linguistically as Portuguese and Spanish show a coefficient of determination[1] $r^2 = 0.75$. However, the coefficient between Spanish and German is $r^2 = 0.09$, $p < 0.01$ (so, $r = 0.30$; compare with B&S's $r = 0.21$), and the one between Spanish and Russian is $r^2 = 0.03$, exhibiting a complete uncorrelatedness (see Table 1). Overall, languages that belong to different subfamilies (e.g., a pair formed by a Romance and a Germanic language) show appreciable disagreement. For languages in the same subfamily, the part on which they agree — as given by the coefficient r^2 — is explicable not by reference to any inherent common intuition of people on the *sex* of things like a book and a tree, but by reference to the fact that Indo-European languages evolved from a common ancestor language, which employed gender, probably one with a strong semantic basis. As languages diverged, so did gender assignments, precisely *because* there is no objective and universal basis on which to decide the gender/sex of "flower", or the idea of "war", or even the words for "cat" and "butterfly". (See Appendix A: each of these words is nearly evenly assigned — close to 50% — between the masculine and feminine genders.) Table 1 shows the coefficients of determination (r^2) between the 14 languages.

B&S's second prediction is that English native speakers' naïve intuitions about the gender of nouns

[1] Since I observed no negative correlation, I prefer to use r^2, the *coefficient of determination*, rather than r, the correlation coefficient, because the former has a natural interpretation, which the latter lacks: r^2 shows the proportion of variation in one population that is explained by the variation in the other population. To be precise, I should employ the non-parametric r_s^2: *Spearman rank coefficient of determination*, since the populations are highly non-normal. However, in our case differences between r^2 and r_s^2 appear only in the second decimal place, so I will keep referring to r^2 in order to facilitate the comparison with B&S's results.

Table 1: Coefficients of determination (r^2) for the 14 languages, plus English monolinguals ('En', last row).

	French												
Fr		Italian											
It	.32		Portuguese										
Pt	.37	.32		Spanish									
Sp	.44	.24	.75		Dutch								
Du	.04	.00	.00	.01		German							
Ge	.07	.03	.06	.09	.24		Icelandic						
Ic	.14	.12	.17	.21	.07	.19		Irish					
Ir	.01	.00	.03	.04	.01	.02	.01		Polish				
Pl	.05	.02	.06	.13	.06	.14	.11	.01		Russian			
Ru	.00	.01	.01	.03	.02	.06	.04	.00	.29		Serbo-Croatian		
Se	.04	.09	.02	.03	.06	.05	.06	.01	.18	.27		Albanian	
Al	.11	.11	.18	.15	.01	.13	.16	.02	.01	.01	.00		Greek
Gr	.14	.10	.09	.11	.00	.14	.15	.00	.03	.02	.14	.19	
Ku	.07	.02	.08	.10	.09	.11	.09	.00	.04	.01	.01	.15	.04
En	.00	.01	.01	.01	.07	.05	.03	.01	.03	.04	.03	.03	.01

Kurdish **avg**

.11 **.03**

should show a correspondence with the assignment of gender in other Indo-European languages. To test this prediction I asked 20 monolingual native American English speakers (10 males and 10 females) to assign a gender, either masculine or feminine, to each of the 84 nouns listed in Appendix A. Subjects showed a remarkable consistency among themselves (average standard deviation $s = 0.18$), especially for words that have a natural association with maleness and potency (e.g., hammer, boulder, thunder, attack, war, lion), or with femaleness and beauty (e.g., flower, happiness, love, butterfly). The average assignments of genders by English monolinguals form a 15th population, which was compared against each of the 14 studied languages to determine the degree of correlation. The last row in Table 1 shows the values of r^2 for each case. We see that the opinion of native English speakers on gender shows a very weak correlation with each of the 14 languages, except possibly Kurdish (which can be attributed to statistical error). No negative correlation was observed. The average of all r^2 is $\langle r^2 \rangle = 0.03$. The *p*-values (indicating linear relationships) are statistically insignificant ($p > 0.05$) for all languages but Dutch, German, and Kurdish. However, it should be noted that the *p*-values are bound to converge to zero given a large enough sample size. What is important is not *whether* a linear relationship exists, suggested by the *p*-values, but *the magnitude* of correlation, given by r^2.

To explain why the correlation between English speakers' intuitions and gender assignment in the 14 studied languages is so weak, we must understand the cognitive processes of gender acquisition in such languages. Young learners of Indo-European languages with formal gender might notice the close correlation between gender and sex *when the noun being referred to is a person* (or even a pet of a known sex). However, learners could not miss noticing the clear *unrelatedness* of gender and sex when the object being referred to is not an animal, and thus lacks sex. In the young learner's world, the nouns for which gender and sex correlate nicely are a small minority compared to those for which the two notions cannot be correlated (because sex is *not* one of the perceived properties of the object referred to by the noun). The situation is depicted in Figure 1.

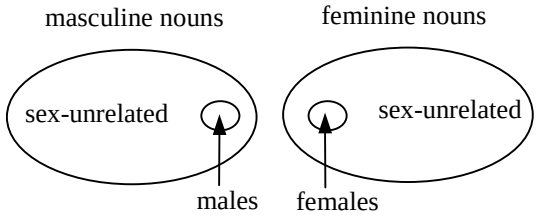

Figure 1: Gender vs. sex in "formal gender" languages

The sizes of the areas in Figure 1 are schematic, but relevant. Assuming the learner's cognitive mechanisms are tuned toward noticing the statistics and learning the regularities of this world, we conclude that the learner of such a language should not find the linguistic category of gender a particularly good predictor of the cognitive percept of sex. We should note that, at an early (pre-school) age, the learner is oblivious to the fact that the name of an observed category of nouns is "masculine", a word closely associated with maleness, while another category is called "feminine"; the learner simply notices the categories. Later, during formal education, the suspected (weak) relation between the notions of gender and sex may be reinforced, but it happens at a time when the learner has already acquired the linguistic category of formal gender, and has already noted that, as Figure 1 suggests, gender is not a good predictor of sex, and the two notions are only loosely related.

On the contrary, learners of languages that employ "natural gender", such as English, notice the close correlation between gender and sex. For such languages, the situation is depicted in Figure 2.

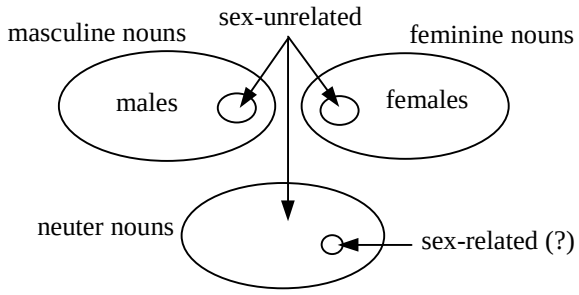

Figure 2: Gender vs. sex in "natural gender" languages

In this case, the intersection of masculine, feminine, and neuter nouns having the "correct" correlation with the percepts "male", "female", and "other" is large. The close correlation between gender and sex thus turns the percept of sex into a *good predictor* of the grammatical category of gender, and vice-versa. This fact may lead speakers of languages employing natural gender into *conflating* the two ideas, and possibly, as the B&S paper implicitly suggests, thinking that native speakers of languages with formal gender may perform a similar conflation. We should note in passing that one of the meanings of the word "gender" in English is "the state of being male, female, or neuter; sex" (Oxford English Dictionary, 1993). Thus, in English, the question "what is your gender?" is a meaningful one to ask a person. In Greek on the other hand, a typical Indo-European language employing formal gender, the same question ("pio eeneh to genos sou?") is absurd, because it implies the questioned entity is a *noun* —akin to asking in English: "what is your declension?"

B&S's Experiment 2

In their second experiment, B&S attempted to test whether "people's ideas about the genders of objects are strongly influenced by the grammatical genders assigned to these objects in their native language" (Boroditsky and Schmidt, 2000: Abstract). B&S based their hypothesis on an earlier study (Konishi, 1993) where German and Spanish speakers judged nouns that were masculine in their languages to be higher in potency than feminine ones, and the tested nouns belonged to opposite genders in the two languages. Subjects assigned subjectively a potency value for each noun, on a 7-point scale. B&S presented 24 pairs consisting of a noun (e.g., "spoon") and a proper name (e.g., "Erica") to 16 German and 25 Spanish native speakers during a learning phase. All nouns were given in English. The subjects' memory of *the sex of the proper name* that had been associated with a noun was examined during the testing phase. As expected, subjects were better able to remember the correct sex (82% correct) when the sex (e.g., "female") matched with the gender (e.g., "feminine"), than when this was not the case (74% correct). Since the nouns were chosen to have opposite genders in the two languages, subjects showed opposite memory biases. B&S concluded that "people's ideas about the genders of objects are strongly influenced by the grammatical genders assigned to those objects in their native language."

As with experiment 1, what is important is not the observation that there is an interference in memory retention between gender and sex, but the *explanation* for this phenomenon. B&S tacitly assume people make a direct connection between the concepts "masculine" and "male", and between "feminine" and "female". This direct connection may be "traversed" in the Spanish speaker's mind when presented with the word "moon" (in Spanish: " luna", of feminine gender), so that they match the "femaleness" of the moon with the femaleness implied by a name like "Karla". A German speaker performing the same task (being presented with "moon" – "Karla") would experience inhibition between moon's "maleness" (in German: " Mond", masculine), and Karla's femaleness, resulting in slightly worse memory performance.

Plausible as this explanation might appear, it makes more sense in the mind of a native speaker of a natural gender language (such as English), where "male" – "masculine" and "female" – "feminine" nearly coincide conceptually. For a native speaker of a formal gender language this explanation seems to be simplistically projecting the natural-gender speaker's view of the world onto everyone else. An alternative explanation is that the interference is caused by a much more indirect relation between noun and proper name than what B&S hypothesize. For example, the word "moon" in a Spanish speaker's mind evokes involuntarily, instantly, and subliminally, the Spanish word "luna". This word is of feminine gender, and is related to the feminine ending "-a", the pronoun " ella", and so on. The proper name "Karla" is also of feminine gender in the Spanish speaker's mind (75% of all female names tested by B&S ended in "-a", the marker of Spanish morphology for feminine nouns), and thus instantly and subliminally related to the same grammatical items ("ella", "feminine", etc). We should note that I make no reference to "moon's sex" in this conceptual plan. In other words, there is a lot of overlap in linguistic connections between "moon"–"luna" and "Karla" in the Spanish speaker's mind.[2] No experimental setting can sever these linguistic connections, and allow us to test exclusively the connections "feminine" – "female" and "masculine" – "male". I do not claim that such direct connections do not exist in the mind of a formal gender language's speaker. Such connections *do* exist. They may be learned in school, where the words for "masculine" and "feminine" are used as labels for categories of nouns the native speaker has already acquired at a very early stage; or they may be based on the small number of sex-related nouns. What I do claim is that experiments such as the one described by B&S (and Konishi) do not necessarily detect the direct influence of a supposed "sex of nouns" on cognition in speakers of languages with formal gender, but instead the very intricate and indirect connections between gender and sex in such languages, which are of both a perceptual as well as a linguistic nature.

[2] This argument is weaker for German speakers, but then we are not given the difference in performance between German and Spanish subjects in B&S's second experiment.

Evolution of Gender

What could the origin of grammatical gender be? B&S hint at possible common intuitions of people across languages, and attempt to quantify this assumption by examining the intuitions of speakers of English. I performed a similar comparison of such intuitions against Indo-European languages, and found that such intuitions do not show any particular correlation with the studied languages (Table 1). Moreover, it would be meaningful to talk about such a correlation *if languages agreed among themselves*. Otherwise, if we find a correlation between the intuitions of monolingual speakers of English and, say, Kurdish, we do not have any reason to assume there is anything other than chance involved. Looking back at the data in Table 1, we see that the only agreement that can be observed among languages is *between members of the same subfamily* (e.g., Portuguese–Spanish, etc.). The more phylogenetically distant the languages, the lower their correlation is (allowing for statistical errors). This hints at a possible answer to the gender-origin question.

That all Indo-European languages evolved from a common ancestor is indisputable. It is plausible to assume that this ancestor language employed a gender system, possibly one with a semantic basis. But what could have caused its modern descendants to assign genders such as masculine and feminine to inanimate objects? And how can a "pure" system (I mentioned Tamil as an example in the introduction) evolve into the modern chaos and disagreement?

The answer some authors have given to these questions is that the origin of gender is purely formal: some suffixes of sex-differentiable nouns acted as attractors, and created the genders in a purely formal, non-semantic way (Brugmann, 1899). This leaves open the question of what caused sex-differentiable nouns, rather than any other category, to become attractors. Another possible answer is that in some languages the initially semantic neuter gender was lost, and the void was filled by masculine and feminine genders being assigned to previously neuter nouns. Such a process can be observed today in Russian, where neuter nouns are only 13% of the total, and loanwords entering the language go primarily to the masculine gender, but also to the feminine (Corbett, 1991:317). This hypothesis does not take into account languages that retain the neuter gender, and still assign masculine and feminine genders to inanimate objects (German, Greek, etc.).

An alternative hypothesis is that masculine and feminine assignments to inanimate objects existed even in the original Indo-European ancestor. Although such assignments seem nonsensical today, they might have "made sense" in the remote past, at least among the few speakers of the ancestor language, based on animistic conceptions of the world. It could have appeared natural to a particular culture that, for example, a stone is of female sex. However, as the original language evolved, ideas about the stone's sex changed, too. Since there is no objective way to agree on something like the sex of a stone, the "opinions" among descendant languages evolved differently. What we observe today appears as a purely formal and arbitrary assignment, since the original "reasons" have been lost. One prediction of this hypothesis is that gender evolution in such languages should be traceable through a weak agreement between phylogenetically proximal languages. I believe the present work supports this implication, although further investigation of the hypothesis is clearly needed.

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Appendix A: Words Examined

The 84 words in four categories are listed below. For the abbreviations used for the 14 languages see Table 1 (in text). The codes of gender values are as follows: -1 for masculine, 0 for neuter, 1 for feminine. Any intermediate values reflect the fact that more than one assignment was possible for a noun (e.g., "sea" in German and Spanish), or more than one noun of differing gender corresponded to the same concept. Blanks indicate that I could not obtain the appropriate gender (or the word is not native to the language). The last column (En) presents the average assignments of 20 American English monolinguals. Words marked with a star (*) were disambiguated for subjects who were asked to assign a gender as follows: table (furniture); chair (furniture); fork (utensil); bridge (over river); paper (a sheet of); bed (furniture); key (locking a door); watch (measuring time); star (on sky); gold (metal); power (of ideas, of wealth); revolution (of people).

	Fr	It	Pt	Sp	Du	Ge	Ic	Ir	Pl	Ru	Se	Al	Gr	Ku	En
Artifacts															
door	1	1	1	1	1	1	1	-1	0	1	1	1	1	-1	.00
wall	-1	0	1	1	-1	1	-1	-1	1	1	-1	-1	-1	1	-.10
table*	1	1	1	1	1	-1	0	-1	-1	-1	-1	1	0	1	.47
chair*	1	1	1	1	-1	-1	0	1	0	-1	1	1	1	0	-.20
spoon	1	-1	1	1	-1	-1	0	1	1	1	-1	1	0		.60
fork*	1	1	-1	-1	1	1	0	-1	-1	1	1	-1	0		.16
knife	-1	1	1	-1	0	0	-1	1	-1	-1	-1	1	0	1	-.50
car	1	1	-1	-1	1	0	0	-1	-1	1	1	1	0		-.50
house	1	1	1	1	0	0	0	-1	-1	-1	1	1	0	0	-.16
bridge*	-1	-1	1	-1	1	1		-1	-1	-1	-1	1	1		-.20
pistol	-1	1	1	1	0	1	1	-1	-1	-1	-1	1	0	1	-.70
book	-1	-1	-1	-1	0	0	0	-1	1	1	1	-1	0	0	.16
paper*	-1	1	-1	-1	0	0	-1	-1	-1	1	0	1	0	1	.20
bed*	-1	-1	1	1	0	0	1	1	0	1	-1	-1	0	1	.47
hammer	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0		-1.00
key*	1	1	1	1	-1	-1	-1	1	-1	-1	-1	-1	0	1	-.58
hat	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	1	0	1	-.30
shirt	0	1	1	1	0	0	1	1	1	1	1	1	0	-1	-.40
watch*	1	-1	-1	-1	0	1	-1	-1	-1	-1	-1	1	0		-.50
pencil	-1	1	-1	-1	0	-1	-1	-1	-1	-1	1	-1	0	-1	-.20
Natural Objects															
sky	-1	-1	-1	-1	1	-1	-1	1	0	0	0	-1	-1	1	.60
sun	-1	-1	-1	-1	1	1	1	1	0	0	0	-1	-1	0	-.10
moon	1	1	1	1	1	-1	0	1	-1	1	-1	1	0	1	.20
star*	1	1	1	1	1	-1	-1	1	1	1	1	-1	0	1	.40
tree	-1	1	1	-1	-1	-1	0	-1	0	0	0	1	0	1	-.30
sea	1	-1	-1	0	1	0	-.5	1	0	0	0	-1	1	1	.20
river	-1	-1	-1	-1	1	-1	0	1	1	1	1	-1	0	-1	.26
thunder	-1	-1	-1	-1	-1	-1	1	1	-1	-1	-1	1	1	1	-1.00
rain	1	1	1	1	-1	-1	0	1	-1	-1	1	-1	1		.70
forest	1	1	1	-1	0	-1	-1	1	-1	-1	1	-1	0	0	-.30
boulder	-1	-1	1	1	1	-1	-1	1	1	1	1	-1	1		-1.00
mountain	1	1	1	1	-1	-1	0	-1	1	1	1	-1	0	-1	-.68
lake	-1	-1	-1	-1	0	-1	0	-1	0	0	0	-1	1	1	.50
air	-1	1	-1	-1	1	1	0	-1	0	-1	-1	-1	-1	0	.20
wind	-1	-1	-1	-1	-1	-1	-1	1	-1	-1	-1	1	-1		.50
earthquake	-1	-1	-1	-1	1	0	-1	-1	0	0	-1	-1	-1	1	-.40
stone	1	1	1	1	-1	-1	-1	1	-1	-1	-1	-1	1	-1	-.80
flower	1	-1	1	1	1	1	0	-1	-1	-1	-1	1	0	1	.90
gold*	-1	-1	-1	-1	0	0	0	-1	0	0	0	-1	-1	-1	-.10
water	1	1	1	1	0	0	0	-1	1	1	1	-1	0	1	.58
island	1	1	1	1	0	1	1	0	1	-1	0	-1	0	1	-.05
fire	-1	-1	-1	-1	0	0	-1	1	-1	-1	1	-1	1	-1	-.70

	Fr	It	Pt	Sp	Du	Ge	Ic	Ir	Pl	Ru	Se	Al	Gr	Ku	En
Abstr. Ideas															
justice	1	1	1	1	1	1	0	-1	1	1	1	1	1	1	-.50
freedom	1	1	1	1	-1	1	.5	1	1	1	1	1	1	1	.00
democracy	1	1	1	1	1	1	0	-1	1	1	1	1	1		-.30
idea	1	1	1	1	0	1	1	-1	1	1	1	1	1	1	.20
group	-1	-1	-1	-1	-1	1	-1	-1	1	1	1	-1	1	1	.20
anger	1	1	1	1	1	-1	1	1	-1	-1	0	-1	-1	1	-.70
surprise	1	1	1	1	1	1	1	-1	0	-1	0	1	1		.60
question	1	1	1	1	1	1	1	1	0	-1	0	1	1	1	.26
hunger	1	1	1	1	-1	-1	0	-1	-1	-1	1	1	1	1	-.37
power*	-1	-1	-1	1	1	1		1	1	1	1	1	1	1	-.70
love	-1	1	-1	-1	1	1	1	-1	1	1	1	1	1	1	.79
revolution*	1	1	1	1	1	1	1	1	1	1	1	-1	1		-.70
friendship	1	1	1	1	1	0	-1	1	1	0	1	1	1	1	.60
war	1	1	1	1	-1	-1	0	-1	1	1	-1	1	-1	.3	-.89
religion	1	1	1	1	-1	1	1	-1	1	1	1	1	1	0	.30
answer	1	1	1	1	0	1	0	-1	1	-1	-1	1	1	1	.05
happiness	-1	1	1	1	0	0	1	-1	0	0	1	1	1	1	1.00
sadness	1	1	1	1	0	1	0	-1	-1	1	1	1	1	1	.70
attack	1	-1	-1	-1	-1	-1	1	-1	-1	0	-1	-1	1	1	-.90
defense	1	1	1	1	.5	1	1	1	1	1	1	1	1	1	-.60
Animals															
cat	-1	-1	-1	-1	1	1	-1	-1	-1	1	1	1	1	1	.58
dog	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	-1	-1	-1	-.80
horse	-1	-1	-1	-1	0	0	-1	-1	-1	-1	-1	-1	0	-1	-.10
lion	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	0		-.90
elephant	-1	1	-1	-1	-1	-1	-1	1	-1	-1	-1	-1	-1	-1	-.60
snake	-1	-1	1	1	1	1	-1	1	-1	1	1	-1	0	-1	-.90
tiger	-1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	-.50
antelope	1	1	-1	-1	1	1	1	-1	1	1	1		1		.10
ant	1	1	1	1	1	1	-1	-1	1	-1	-1	1	0	1	.00
fly	1	1	1	1	1	1	1	1	1	1	1	1	1	1	.30
butterfly	-1	1	1	1	-1	0	0	-1	-1	1	-1	1	1	1	.90
bee	1	1	1	1	1	1	.5	1	1	1	1	0	1		.50
bird	-1	1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	0	-1	.60
wolf	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-.90
fox	-1	1	1	0	-1	-1	.3	-1	-1	1	1	1	1	-1	-.20
fish	-1	-1	-1	-1	0	-1	-1	-1	1	1	1	-1	0	-1	.37
sparrow	-1	-1	-1	-1	1	-1	-1	-1	-1	-1	-1	-1	0		.50
penguin	-1	-1	-1	-1	0	-1		1	-1	-1	-1	-1	-1		.20
chimp.	-1	-1	-1	-1	0	-1	-1	-1	0	-1	0		-1		-.30
bear	0	0	-1	-1	-1	-1	-.5	-1	0	-1	-1	-1	1		-.80
spider	1	-1	1	1	1	1	1	-1	-1	-1	-1	1	1		.10
whale	1	1	1	1	-1	0	-1	-1	-1	-1	-1	1	1	-1	-.60