

# **On the bioeconomics of shame and guilt**

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**Abstract:** Shame has biological roots, possibly enhancing trust, favoring social cohesion.

We studied bioeconomic aspects of shame and guilt using three approaches: 1- Anthro-linguistic studies of *Guilt* and *Shame* among the Yanomami, a culturally isolated traditional tribal society; 2- Estimates of the importance different languages assign to the concepts *Shame*, *Guilt*, *Pain*, *Embarrassment*, *Fear* and *Trust*, counting the number of synonyms listed by Google Translate; 3- Quantitative correlations between this linguistic data with socioeconomic indexes. Results showed that Yanomami is unique in having overlapping synonyms for *Shame*, *Fear* and *Embarrassment*. No language had overlapping synonyms for *Shame* and *Guilt*. Societies previously described as “Guilt Societies” have more synonyms for *Guilt* than for *Shame*. A large majority of languages, including those from societies previously described as “Shame Societies”, have more words for *Shame* than for *Guilt*. The number of synonyms for *Guilt* and *Shame* strongly correlated with estimates of corruption, ease of doing business and governance, but not with levels of interpersonal trust. We propose that cultural evolution of shame has continued the work of biological evolution, but its adaptive advantage to society is still unclear. Results suggest that recent cultural evolution must be responsible for the relationship between the levels of corruption of a society and the number of synonyms for *Guilt* and *Shame* in its language. This opens a novel window for the study of complex interactions between biological and cultural evolution of cognition and emotions, which might help broaden our insight into bioeconomics.

## 1. Introduction

Guilt is an emotion that occurs when a person feels that it has violated a moral standard. It is triggered by behavior that harms others, and relates to sorrow, remorse and want of reparation. Guilt says “what I *did* was not good”, whereas shame says “I *am* no good” (Bradshaw 1988). Shame is a consequence of a violation of cultural or social values, while guilt feelings arise from violations of one's internal values (Benedict 1946). Cultural differences between the emphasis societies lay on both concepts exist (Casimire & Schnegg 2003, Hiebert 1985, Kim et al. 2011, Kitayama et al. 1995, 2000, Russell 1991, Scherer & Wallbott 1994, Shaver et al. 1992, Silfver 2009, Tangney & Dearing 2002, Wierzbicka, 1999). Shame societies aim to gain control over children, maintaining social order, by inculcating shame and the complementary threat of ostracism. In contrast guilt societies create and reinforce the feeling of guilt (and the expectation of punishment now or in the hereafter) for certain condemned behaviors (Benedict 1946, Dodds 1951, Elison 2005).

The emotion of shame has clear physiological consequences. Looking away, reddening of the face, sinking the head, obstructing direct view, hiding the face and lowering the eyelids, are the unequivocal expressions signaling shame (Darwin 1872). Behaviors in animals that share some aspects of shame include submission, both in interactions between adult-offspring and in other social contexts, and cryptic expressions of fear that are an attempt to hide when in presence of stronger rivals or potential predators. Yet shame may be exclusive of humans, as it seems not to be shared

by other social primates (Boehm 2004). Shame has been postulated since ancient times as an important biological factor in the social cement. Classical Greek philosophers, such as Aristotle, and Chinese ones such as Confucius, explicitly mention shame as a key element in building society.

The emotion of shame has undergone both biological and cultural evolution. Although the mechanisms upon which both types of evolution are based on differ widely, its dynamics seem to be similar (Jaffe & Cipriani 2007, Martinez & Jaffe 2008). A deeper understanding of shame can serve as an empirical test of the relation between cultural and biological evolution. Cultural evolution could continue the work of biological evolution, if the adaptive advantages of shame are maintained over time; or both types of evolution might drive the behavioral-cultural system to different outcomes, if the adaptive advantages of shame differ in different cultures. Shame can be viewed as a trigger of honest signals regulating social interactions, where the benefits to society is the identification of trustworthy individuals and the benefit to the individual is reducing or avoiding social punishment when transgressing a social norm. Unobservable emotions such as guilt may be of value to the receiver but constitutes in economy “private information” whereas shame, as a “public information” is valuable to society. Thus, in economic and biological terms, adaptive pressures acting upon the evolution of shame might differ from those acting on that of guilt.

Shame has evolutionary advantages to both individual and society, but the lack of shame may also favor the individual as it allows cheating and thus benefiting from public

goods without paying the costs of its build up. For example, shamelessness might be an advantage in politics or for combatants, as signaling shame to an opponent might often be counterproductive. Adaptation seems to have settled for intermediate levels of shame among humans. Excess of shame has been associated with pathologies. For example, high levels of shame are linked to mental illness (Ferguson et al. 1999, Lewis 2000, Scheff & Retzinger 1991, Tantam 1998, Campbell & Elison 2005) and to physiological stress (Dickerson et al. 2004, Gruenewald et al. 2004, Lewis & Ramsay 2002). On the other hand, a deficit of shame also relates with pathological states, as shameless individuals are prone to suffer psychopathic syndromes (Campbell & Elison 2005, Holmqvist 2008, Morrison & Gilbert 2001). These divergent adaptive forces have an interesting effect on the evolutionary dynamics of shame. Computer simulations of virtual societies formed by agents who can cooperate synergistically, mutualistically or egoistically showed that genes or memes coding for shame will always evolve and eventually displace genes or memes coding for shamelessness, but the opposite will also happen. The outcome of computer simulations is a dynamic unstable equilibrium between both strategies, producing as a result chaotic-like dynamics with spells of stable shameful populations followed by spells of shameless populations (Jaffe 2008). These results predict variable levels of shame among distinct populations.

Dodds (1951) coined the distinction between guilt and shame cultures and postulated that in Greek cultural history, shame as a social value was displaced, at least in part, by guilt in guiding moral behavior. He postulated the existence of two distinct

cultures based on distinct emphasis or importance of the relation between guilt and shame. In their extensive review of cultural models of shame and guilt, Wong and Tsai (2007) propose an individualistic and a collectivist model of shame and guilt, where the valuation, elicitors and behavioral consequences, as well as the distinction between shame and guilt, vary systematically across individualistic and collectivist cultures. Their review includes a relatively small group of cultures and they convincingly argue for the need of further cross cultural research.

Most evolutionary hypotheses consider shame as fomenting trust, and thus social cooperation, by triggering facial expressions that provide biological “honest signals” Darwin (1972). Others relate it to submissive behaviors and in particular the social dynamic of social ranking (Boehm 2012, Gilbert & McQuire, 1998). More recently, shame is viewed as an adaption that stabilize long term relationships among sexual partners, allowing for the existence of families which in turn facilitate parental care, serving as building blocks of society (Jaffe et al 2014). All these hypothesis assume that shame has evolved to stabilizing relationship security in various contexts (Gilbert 2007, Kaufman 1996).

Recent research (Jaffe et al. 2014) suggest the existence of at least two different types of shame that are affected in different ways by environmental conditions: Shame upon being seen naked, which is negatively correlated with Body Mass Index; and shame related to interactions with peers that correlates positively with Food Insecurity. The results are consistent with the notion that shame is an evolutionary adaptation,

malleable by environmental conditions, fomenting fidelity among reproductive couples, stabilizing families in the long term, and eventually enhancing trust and social cohesiveness.

Here we focus on adding empirical observations on the role of shame and guilt in our societies. We explore a bioeconomic approach to the problem tackling some basic assumption about the existence of adaptive forces, be they biological or cultural in origin, which might have selected for a balance between the feelings of shame and guilt. These approaches are:

***The anthropological approach***, where we explore the meanings of concepts related to shame and guilt among the Yanomami, a culturally isolated traditional tribal society of horticulturist hunter-gatherer in the Orinoco river basin. These results exemplify the perceptions of shame and guilt in a human group that lives in conditions that are closer to those prevailing during the period of human evolution where instincts for shame might have suffered stronger adaptive pressure.

***The linguistic approach***, where we compare linguistic differences covering many different languages, using automatic algorithms provided by Google Translate. This minimizes subjective criteria in inter-cultural comparisons, by applying the same method with the same errors in the analysis of all languages. Some scholars avoid using Wikipedia or Google search tools as they consider them not to be scientifically validated and recognized methods. We believe that these modern tools have many benefits over traditional one. They are cheap to use, easy to replicate, cover a very broad area of

search space and are at least as reliable as traditional research methods. For example, Wikipedia is less error prone than Encyclopedia Britannica (Giles 2005, Holman 2008); and Google Translate is as accurate as more traditional methods (Rodriguez et al. 2005).

***The bioeconomic approach.*** Few studies relate linguistic characteristics of a society with economic relevant features (but see Chen 2013). Data on socioeconomic variables for countries speaking different languages exist, allowing us to perform some statistical analysis on the bioeconomy of shame.

## **2. Methods**

### **2.1 The anthropological approach**

Data for the Sanema, an indigenous horticulturist group belonging to the cultural-ethnic complex of the Yanomami (Mattei 2007), were collected during several field trips to communities located on the banks of the Caura River, Bolivar State, Venezuela, during 2012. With the help of native Spanish-Sanema translators, we interviewed 16 Sanema people, members of the Ikutu community. We asked them questions regarding words used in different contexts and contexts in which different words are used. Thus, we were able to determine which words are commonly used in contexts usually related to shame, guilt, pain, embarrassment and fear. For Yanomami we used the Spanish-Yanomami dictionary by Marie Claude Mattei-Muller (2007).

### **2.2 The linguistic approach**

We wanted to assess the relative importance of the meaning of shame and guilt

in different cultures. This can be done by counting the number of synonyms of each word in each language and assuming that cultures that have developed more synonyms for a specific concept have dedicated more attention to it and thus are likely to give it more importance than other concept which have fewer or no synonyms. For example Inuit's use dozen of words for snow whereas Yanomami have none. This difference clearly reflects the relative importance of snow in each culture. Inuit's contact snow nearly all year long whereas Yanomami never see it. Using "Google Translate" (last searched May 2014) we translated and noted the synonyms of the English words: *shame, guilt, pain, embarrassment* and *fear* to 52 languages (reported in Table 1 which also includes Yanomami). Languages for which Google Translate showed only one word for each of the 6 concepts were excluded from Table 1, unless they had overlapping words for some of the concepts. For the data on English, Yanomami and Sanema, we translated from the Spanish words: *vergüenza, culpa, dolor, pena* and *miedo*. Google Translate, has an uneven coverage of the languages reported. For each language, however, it is likely to have similar coverage of the concepts studied. Thus, any difference in coverage of a language less likely to affect the ratio of synonyms of two related concepts. But important errors have been detected. For example Czech and Slovak languages showed large differences in the number of terms for guilt and shame (1 & 3 for Czech and 5 & 9 for Slovak) given that the two languages are very closely related (Štěpán Bahník personal communication). The ratio between the numbers, however, showed less variation (0.3 and 0.5). This error is somehow captured by the 95% standard

error interval in Figure 1, where Slovak is positioned below the upper 95% limit. Google Translate produces more erroneous data. For example it reports a word in Slovak to describe indistinctly shame and pain; this is not true as the word *otrava* means either poisoning, nuisance or boredom. Correcting this error in the figure, improves the picture but more errors with other languages are to be expected. Michael Ghiseling (personal communication) commented that for English the three “synonyms” of “guilt”, namely “fault”, “blame”, and “onus” result from the fact that “guilt” does not always refer to the emotion, but to a judgment of society that is reflected in legal discourse. A jury finds someone guilty. We blame someone for doing something for which he may or may not be responsible. “Onus” is a synonym for “blame,” and does not imply feelings of guilt: it means responsibility or stigma. Again, “embarrassment” is an emotion, and it seems to have few synonyms. “Sultriness” is not a synonym of “embarrassment.” Rather it means hotness, as in hotness of passion. There are many “synonyms” listed by Google Translate for “pain” but some of those are things that might cause it. A penalty, an affliction, or a forfeit, is not a pain. Labor is a cause of pain in childbirth, and “fash” is mostly Scottish dialect meaning annoyance, not pain. On the other hand English has legitimate synonyms for “pain” that have been overlooked. These imply different degrees of pain such as “anguish” and “agony.” The list by Google Translate includes synonyms that differ only in the endings: “trust” and “trustfulness,” “dependence” and “dependability.”

These examples show that the conceptualization of “synonym” used by Google

Translate is very broad, but words classified as “synonyms” always relate somehow to the target word. Assuming that what Google calls “synonyms” in all languages studied are “related words”, and that the number of languages studied is large, the study might be useful to get some meaningful preliminary results. The analysis performed here will have to be repeated in the future when better data will be available. During the two years of the study, new languages were included and words in existing languages were increased. To reduce errors to a minimum, we avoided using data for languages which did not produced lists of synonyms with Google Scholar.

### **2.3 The bioeconomic approach**

We choose countries where Google Translate reported more than one synonym for any of the 6 concepts and where the languages had a chance to evolve independently. Countries with multilingual cultures and those with large scale immigration or population change during the last three centuries were excluded. This allowed us to make the statistical analysis reported in Table 3, using 37 pairs of languages and their mother country listed in Table 2.

## **3 Results**

### **3.1 The anthropological approach**

Yanomami is very different from other languages in not having clear divisions between several of the concepts studied. Yanomami’s are a very distinct Amerindian hunter-gather community in the Orinoco-Amazon basin of Brazil and Venezuela, and

differ from other Amerindians and western cultures in that they spend more time in communal relationships so that they are focused more on society than on the individual (Eibl-Eibesfeldt 1989). Their knowledge of nature is more restricted than that of other communities living in the same area (Herzog et al., 1985, Jaffe & Muller 1989). To our knowledge, Yanomami is the only language that uses the same word to refer to shame, pain, fear, guilt and embarrassment. We thus, studied in more depth the concept of shame among Sanema, one of the four dialects of Yanomami. The word most Sanema related to shame was “kili”. Examples of the context when they feel “kili” are: a tiger appears in the forest; you kill somebody from another community; your daughter is going to die; everybody looks at your underwear; you are caught stealing; you soil your pants while among others; a doctor gives you an injection; you hit your wife and others find out; you are unfaithful to your husband and others find out; you are going to be hit with a machete.

### **3.2 The linguistic approach**

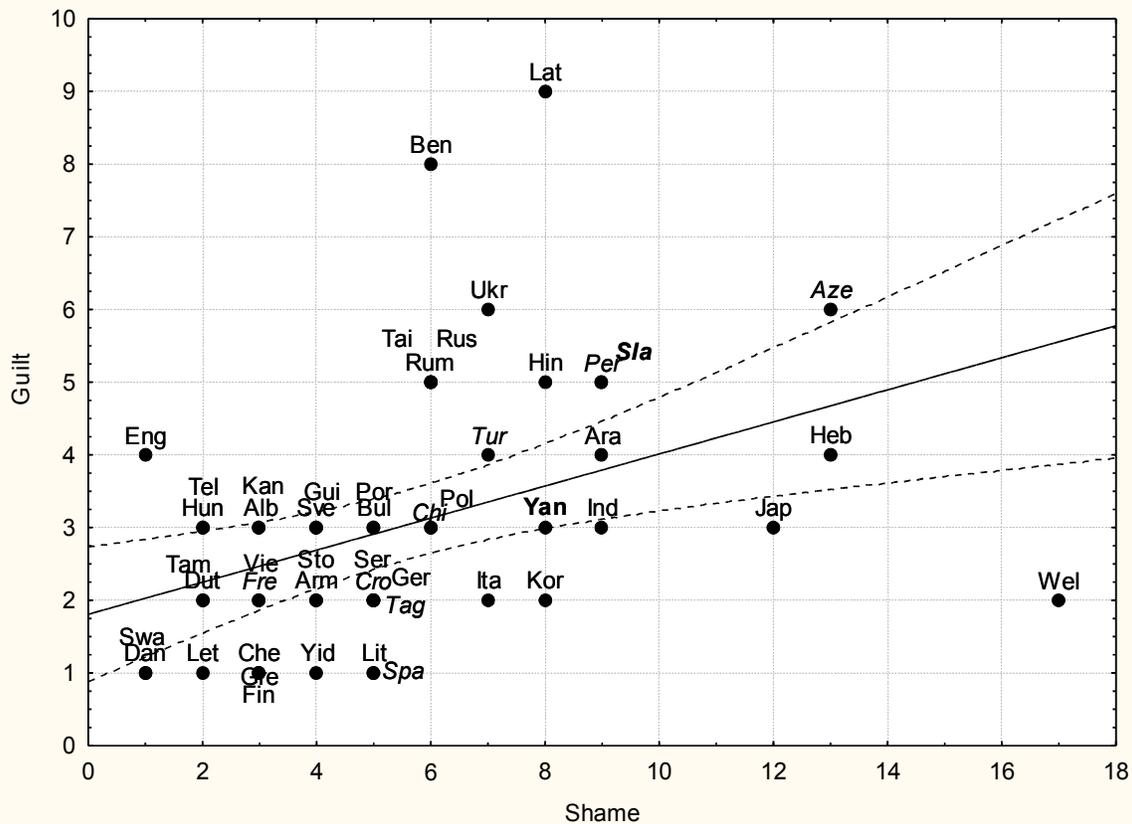
All languages studied had separate concepts for *Guilt* and *Shame*. Results presented in Figure 1 show that most languages listed in Table 1 had more words for *Shame* than for *Guilt* ( 38 vs 5). In Figure 1, languages which have at least one word that is a synonym for both, *shame* and *embarrassment* are shown. The total list includes Arabic, Azerbaijani, Catalan, Croatian, Filipino, French, Irish, Macedonian, Malay, Persian, Swahili, Turkish, Slovak, and Spanish. Slovak has a word to describe indistinctly *Shame* and *Pain*; and Yanomami and Sanema use the same word for *Shame*, *Embarrassment*

and *Fear*.

All languages had clear linguistic separation between *Shame* and *Guilt*. That is, not a single language shares a synonym between both concepts. The concept that on average had the largest number of synonyms was *Pain* followed by *Trust*. *Guilt* had the least number of synonyms followed by *Embarrassment* (Table 1).

The line in Figure 1 represents the regression with its 95% confidence interval. This regression is close to a proportional line of the number of synonyms for *Shame* and *Guilt*. Dots below the line indicate languages where more words than the 2/1 proportion are used for shame than for guilt. Interestingly, languages which confuse shame with another concept, are mostly found only below the upper 95% confidence limit of this regression line.

**Figure 1:** Relation between the number of words for “Shame” and for “Guilt” as translated by Google Translate for languages reported in Table 1. The line shows the linear regression with its 95% confidence interval. Languages that share synonyms among Shame and Embarrassment are in *italics*, Shame and Pain in ***bold italics*** or Shame and Fear in **bold**. Other languages in Table 1 with only 1 word for shame and 1 for guilt include: Cat, Eri, Mac and Mal



We might underestimate the overlap of the meaning of words. For example, in the case of Chinese, no overlap between the five concepts is reported using Google Translate in Table 1. Yet, linguistic-conceptual studies of guilt and shame revealed an important overlap between several of these concepts in Chinese (Li et al. 2004). The authors found, at the highest abstract level, two large distinctions of “shame state, self-focus” and “reactions to shame, other-focus.” While the former describes various aspects of actual shame experience that focuses on the self, the latter focuses on consequences of and reactions to shame directed at others. Shame state with self-focus contained three further sets of meanings: 1- one’s fear of losing face, 2- the feeling state

after one's face has been lost, and 3- guilt. Reactions to shame with other-focus also consisted of three further sets of sub-components at the same level: 4- disgrace, 5- shamelessness and its condemnation, and 6- embarrassment. Except for guilt, there were several sub-clusters under each of these categories.

Our results using Google Translate showed a few languages that had more words for *Guilt* than for *Shame*. This is interesting in the light of the distinction made previously between *Shame* and *Guilt* societies by Wong & Tsai (2007). Although some cultures are multi-linguistic it is not difficult to match the languages analyzed with the societies reported by Wong & Tsai (2007). There seems to be a significant overlap between both ways of measuring the shame-guilt dimension. All societies that had been reported as "guilt societies" speak languages that have more words for guilt as that predicted by the regression in Figure 1 (i.e. less than 2 synonyms for shame for each synonym of guilt), i.e. Anglo-Saxon western societies; whereas the "shame societies", reported in the literature (Hofstede 2001, Inglehart 1997, Schwartz 2007): Japan, Persia, Arabs and China, use languages with two or more words for shame than for each synonym for guilt.

### **3.3 The bioeconomic approach**

The number of synonyms for *Shame* and those for *Guilt*, *Fear* and *Trust* correlated strongly, and so did the number of synonyms of *Fear* with those for *Pain* and *Guilt* (Table 3). However, the number of synonyms of each concept correlated differently with socioeconomic indicators. Table 3 present the results of correlations using only data on countries that could be associated unambiguously to a given language. Correlations

were calculated with the non-parametric Gamma statistics. No correlates between any of the socioeconomic indicators and the *Shame/Guilt* ratio that identifies shame or guilt societies were found (not shown). Interestingly however, the number of synonyms a given language has for *Guilt* correlated strongly with the Corruption perception index calculated by Transparency International, the Governance Index, the Doing Business Index, Life expectancy and GDP/capita reported by the World Bank. That is, countries speaking languages that use many words as “synonymous” for *Guilt* are also countries with high levels of corruption, low governance, difficulties in doing business, low life expectancy and low income per person. The languages of countries with large populations, had significantly more synonyms for *Shame* and *Fear*. None of the linguistic measures correlated with the level of interpersonal trust measured using questionnaires, nor with indicators such as Well-Being or Happy Life produced by Happy Planet (Table 3). A multiple regression analysis revealed the same statistical significant relationships reported in Table 3 (see Table 1).

#### **4. Discussion**

Our study suggest that tools, such as Google Translates, may be useful aids in ranking the importance of different concepts in different cultures. Here we showed that all languages examined with Google Translate had unambiguous words for shame and guilt suggesting that all cultures have a sharp distinction between these two concepts. This finding reveals a high degree of universality in the different emotional patterns and

in the cultural differences in emotional elicitation of shame and guilt (Scherer & Wallbott 1994). Thus, the distinction between Shame and Guilt in humans probably has biological roots, as is implicit in the suggestions by Boehm (2004) and Darwin (1872). In contrast, the fact that the pattern of “synonym” or related concepts numbers for the 6 concepts studied varied widely between languages of the same linguistic family suggest that this diversity of linguistic usage for shame and guilt is rather driven by cultural evolution.

The subtle differences between the number of “synonyms” for guilt and shame here described are consistent with what has been previously referred to as shame and guilt societies. However, we could not find any socioeconomic indicator related to that difference. All societies or cultures that had been referred to as “shame societies” in the literature had high scores on relative frequency of words for shame/guilt, whereas those referred to as “guilt societies” had a low score in this relationship. The present study provides for putative quantitative measure or testable predictions for identifying a society as closer to a “guilt” or “shame society”. For example, Hungarian, Telugu, Bengali, and Latin should be spoken in “guilt” societies; whereas Hebrew, Italian, Korean, Yiddish, Spanish and Lithuanian should be spoken in “shame societies”.

The fact that all languages studied had a word for shame and that it was clearly different from that of guilt, support the view that these concepts are based on human biological instincts. But neither biological nor cultural evolution seem to provide a strong adaptive advantage to either shame or guilt. The divergence between guilt and shame societies seems to be a natural outcome of the distinct adaptive advantages of shame

and guilt, as predicted from simulating shame in virtual societies (Jaffe 2001). These simulations showed that shame, together with pro-social punishment and social cooperation, produce fluctuating dynamics of social cooperation, achieving long periods where the populations stabilizes pro-social behavior interspersed with periods where selfish behavior predominates. Although shamelessness could in theory out-evolve shamefulness, empirical evidence suggest otherwise. There is overwhelming evidence that cooperation is often more successful in evolution than confrontation (see Jaffe 2002, 2010, Osborne & Jaffe 1997, Wilson 2012, for example) suggesting that shamelessness, good for confrontation, is not likely to out-evolve shamefulness which is favors cooperation. The data presented here seems to be consistent with this view. Some societies place more importance on guilt than on shame, but the large majority does the inverse. A few societies have a concept of shame that overlaps with that for embarrassment, whereas others separate these concepts very clearly. But all societies separate clearly *Shame* from *Guilt*.

A relevant results in a bioeconomic context is the robust correlation found between the number of synonyms for *Guilt* and *Shame* a language has, and the likelihood that the country producing and speaking that language will be corrupt, ungovernable and business unfriendly. This is a robust quantitative support for the popular assumption that culture influences socioeconomic aspects of a society. Our study does not allow to identify any causal relationships. Cultures prone to corruption might develop more words describing aspects of it; or societies with a complex

relationship to guilt might be more prone to more corruption. The most likely scenario is that economies, cultures and language influence each other in many different ways. Here we show only that we are able to detect quantitatively indicators as to aspects of a culture that are related to the likelihood that its society is corrupt, as this likelihood is related to the probability that its language will have many words describing aspects of the consequences of the social implications of this socioeconomic fact.

The clear separation between guilt and shame despite the wide scatter in the quantitative properties of the concepts in the languages studied is consistent with evolutionary models of shame which predict a wide scatter in the relative importance of shame. This result hints to some biological roots of psychological features regulating our emotions. At the same time the lack of similarities in the quantitative properties of the concept studied among languages in the same language family hints at recent cultural evolution affecting these features. Thus, we have a case where both, biological and cultural evolution are working together.

None of the existing hypothesis about the social role of of guilt and shame predicted the results found here. This suggests that their role is far more complex as hitherto supposed, hinting that more empirical data is needed. Despite the preliminary nature, this exploration opens new windows into the search for the evolution of emotions, showing that bioeconomic approaches can widen our view on the subject suggested by psychologists and sociologists.

The study of shame and guilt seem a good starting point to study the interaction

between biological and cultural evolution. Few cognitive features are so related to our social instinct as shame and guilt, thus, it is astonishing that we know so little about shame and its relation to social and economic relevant features such as corruption. The study by Chen (2013) of the effect of language on economic behavior related to saving rates, health behaviors, and retirement assets, is a good example of how bioeconomics reveals interesting relationships between these aspects. Thus more extensive interdisciplinary analysis, including linguistic studies, finer anthropological synthesis of the literature, neuroethology and other insights from disciplines, should help improve our understanding of the relation between cognition, emotions and its evolution in an economic context.

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**Table 1.** Synonymous as reported by Google Translate in 2013 and Multiple Regression analysis comparing the importance of emotions in a given language to socioeconomic variables of the moder country of that language. See Supplementary Material in [http://atta.labb.usb.ve/Klaus/SM\\_BE2014.html](http://atta.labb.usb.ve/Klaus/SM_BE2014.html)

**Table 2:** Languages covered in this study and reported in Table 1. Pairs of language and country used for bioeconomic statistical analysis are listed in the first two columns. Languages in the third column are not spoken homogeneously in any country, or as in the case of Korean, no reliable data exist for North Korea, and choosing only South Korea could be considered as biased.

Abb	Language	Country	Abb	Language	Country	Abb	Language
Alb	Albanian	Albania	Ita	Italian	Italy		

Ara	Arab	Saudi Arabia	Jap	Japanese	Japan	Cat	Catalan
Arm	Armenian	Armenia	Lav	Latvian	Latvia	Eng	English
Aze	Azerbaijani	Azerbaijan	Lit	Lithuanian	Lithuania	Eri	Irish
Ben	Bengali	Bangladesh	Per	Persian	Iran	Hin	Hindi
Bul	Bulgar	Bulgaria	Pol	Polish	Poland	Guj	Gujarati
Che	Czech	Czech Re	Por	Portuguese	Portugal	Mac	Macedonian
Chi	Chinese	China	Rum	Romanian	Romania	Mal	Malay
Cro	Croat	Croatia	Rus	Russian	Russia	Kan	Kannada
Dan	Danish	Denmark	Ser	Serbian	Serbia	Kor	Korean
Dut	Dutch	Netherlands	Sla	Slovak	Slovakia	Lat	Latin
Fin	Finnish	Finland	Spa	Spanish	Spain	Tam	Tamil
Fre	French	France	Sto	Estonian	Estonia	Tel	Telugu
Ger	German	Germany	Sve	Swedish	Sweden	Swa	Swahiu
Gre	Greek	Greece	Tag	Tagalog	Philippines	Wel	Welsh
Heb	Hebrew	Israel	Tai	Thai	Thailand	Yan	Yanomami
Hun	Hungarian	Hungary	Tur	Turkish	Turkey	Yid	Yiddish
Ind	Indonesian	Indonesia	Ukr	Ukrainian	Ukraine		
			Vie	Vietnamese	Vietnam		

**Table 3:** Gamma correlations between number of synonyms for each concept and socioeconomic indicators for countries listed in Table 3. Significance is indicated as: \*\*\* for  $p < 0.001$ ; \*\* for  $p < 0.01$ ; \* for  $p < 0.05$ ; and ^ for  $p < 0.1$ .

	Shame	Guilt	Pain	Emba	Fear	Trust
<b>Guilt</b> <sub>1</sub>	<b>0.64</b> ***	┘				
<b>Pain</b> <sub>1</sub>	0.19	<b>0.23</b> ^	┘			
<b>Embarrassment</b> <sub>1</sub>	0.01	<b>0.24</b> ^	0.20	┘		
<b>Fear</b> <sub>1</sub>	<b>0.60</b> ***	<b>0.49</b> ***	<b>0.44</b> ***	0.21	┘	
<b>Trust</b> <sub>1</sub>	<b>0.45</b> ***	0.22	0.08	-0.01	<b>0.30</b> *	┘
<b>IP Trust</b> <sub>2</sub>	-0.15	-0.11	0.02	0.11	-0.13	-0.14
<b>Corrup Rank</b> <sub>3</sub>	<b>0.31</b> *	<b>0.44</b> ***	-0.13	0.10	0.16	0.12

<b>Doing Business</b> <sub>4</sub>	<b>0.23</b> ^	<b>0.30</b> *	-0.11	-0.02	0.13	0.16
<b>Governance Rank</b> <sub>5</sub>	<b>0.27</b> *	<b>0.37</b> **	-0.17	0.06	0.15	-0.01
<b>Life Expectancy</b> <sub>4</sub>	<b>-0.22</b> ^	<b>-0.35</b> **	0.08	-0.16	<b>-0.23</b> ^	0.01
<b>GDP/capita</b> <sub>4</sub>	-0.19	<b>-0.32</b> *	-0.02	-0.13	-0.19	-0.02
<b>Well-Being</b> <sub>5</sub>	-0.09	-0.21	0.09	-0.08	-0.12	-0.06
<b>Happy Life</b> <sub>5</sub>	-0.13	<b>-0.27</b> *	0.10	-0.11	-0.17	-0.05
<b>Population</b> <sub>4</sub>	<b>0.31</b> *	<b>0.29</b> *	0.19	0.03	<b>0.40</b> **	<b>0.24</b> ^

1: Number of words provided by Google Translate given in Table 1

2: Interpersonal Trust, 2014, Medrano, J.D. WVS archive

[www.jdsurvey.net/jds/jdsurveyMaps.jsp?Idioma=I&SeccionTexto=0404&NOID=104](http://www.jdsurvey.net/jds/jdsurveyMaps.jsp?Idioma=I&SeccionTexto=0404&NOID=104)

3: Transparency International, Corruption Perception Index 2013. [www.transparency.org/cpi2013/results](http://www.transparency.org/cpi2013/results)

4: Ease of Doing Business World Bank 2013

5: Happy Planet, 2013 [www.happyplanetindex.org/assets/hpi-data.xlsx](http://www.happyplanetindex.org/assets/hpi-data.xlsx)