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Can Language Make You Economically Human and Happy? Some Statistical Views on Socioeconomic Performance, Language Policies and Patterns of Communication

Abstract

In this contribution, the socioeconomic Happy Planet Index (HPI; it takes into account life expectancy, subjective life satisfaction, and ecological footprint per capita), the Human Development Index (HDI; it takes into account life expectancy, education and per-capita gross domestic product) and, in part, the Human Poverty Index are related to 12 categories of language policies for official contexts and to 4 categories of culture-specific communicative patterns (as defined by Geert Hofstede, Richard Lewis and Morrison/Conaway). The following aspects show statistical significance: (1) The average HPI of individualistic countries is worse than the average HPI of collectivistic countries. (2) The average HDI of individualistic countries is better than the average HDI of collectivistic countries. (3) The average HPI of dialog-oriented countries is better than the average HPI of data-oriented countries. (4) The average HDI of dialog-oriented countries is worse than the average HDI of data-oriented countries. (5) The average HDI between linear-active countries is better than the average HDI of multi-active countries.

Sommaire

Dans cette contribution, trois indices socioéconomiques, le Happy Planet Index (HPI; il tient compte de l'espérance de vie, le degré subjectif de bonheur des populations et de l'empreinte écologique), l'indice de développement humain (Human Development Index/HDI; il tient compte de l'espérance de vie, le niveau d'éducation et le produit intérieur brut par habitant) et, en part, l'indicateur de pauvreté humaine (Human Poverty Index) sont croisés avec 12 catégories de politiques linguistiques pour des contextes officiels et avec 4 catégories de comportement communicatif (comme défini par Geert Hofstede, Richard Lewis and Morrison/Conaway). Les aspects suivants sont statistiquement significatifs: (1) Le HPI moyen des pays individualistes est plus mauvais que le HPI moyen des pays collectivistes. (2) Le HDI moyen des pays individualistes est meilleur que le HDI moyen des pays collectivistes. (3) Le HPI moyen des pays d'orientation sur les dialogues est meilleur que le HPI moyen des pays d'orientation sur les dates. (4) Le HDI moyen des pays d'orientation sur les dialogues est plus mauvais que le HDI moyen des pays d'orientation sur les dates. (5) Le HDI moyen des pays actifs linéairement est meilleur que le HDI moyen des pays multi-actifs.

Zusammenfassung

In diesem Beitrag werden der sozioökonomische Happy Planet Index (HPI; er berücksichtigt Lebenserwartung, subjektive Lebenszufriedenheit und Ökologischen Fußabdruck), der Human Development Index (HDI; er berücksichtigt Lebenserwartung, Bildungsgrad und Bruttoinlandsprodukt pro Kopf) und teilweise der Human Poverty Index mit 12 Kategorien an Sprachpolitik für offizielle Kontexte und mit 4 Kategorien kulturspezifischer Kommunikationsmuster (wie sie von Geert Hofstede, Richard Lewis und Morrison/Conaway definiert werden) in Bezug gesetzt. Die folgenden Aspekte zeigen statistische Signifikanz: (1) Der durchschnittliche HPI von individualistischen Ländern ist schlechter als der durchschnittliche HPI von kollektivistischen Ländern. (2) Der durchschnittliche HDI von individualistischen Ländern ist besser als der durchschnittliche HDI von kollektivistischen Ländern. (3) Der durchschnittliche HPI von dialog-orientierten Ländern ist besser als der durchschnittliche HPI von daten-orientierten Ländern. (4) Der durchschnittliche HDI von dialog-orientierten Ländern ist schlechter als der durchschnittliche HDI von daten-orientierten Ländern. (5) Der durchschnittliche HDI von linear-aktiven Ländern ist besser als der durchschnittliche HDI von multi-aktiven Ländern.

1. Introductory Remarks

2010 is the European Year of Combating Poverty and Social Exclusion. How can this topic be related to Eurolinguistics, or to linguistics in general? How can (Euro-)linguistics help in this combat? For one, it seems to be a natural assumption that better skills in a language or in several languages give people better chances to interact with other people (thus combating social exclusion) and to find more job opportunities (thus combating poverty). But different languages and language combinations may be differently powerful in that combat. This is one issue that some researchers have dealt with. Linguistic and economic research have been being combined since the mid-1960's (cf. Grin 1996 and Coulmas 2005 for overviews). The large majority of these studies have focused on the socioeconomic status of individuals. In contrast, relatively few of them have focused on the relation between a country's socioeconomic performance and its language policies. Exceptions are the studies by Pool (1972, 1991), Coulmas (1992), Grin (e.g. 2003), Sproull/Ashcroft (1993), and Sproull (1996), to a certain extent also Thorburn (1971), Jernudd (1971), Forgues (2007) and Kamwangamalu (2010). Some of them investigate just one country. Due to the international interconnectedness of socioeconomic processes and the importance of global communication, though, we need multinational analyses that do not correlate socioeconomic success to geographical, demographical and (systemic) political aspects only. Socioeconomic and communicative aspects are worth correlating, too.

In this paper I would like to shed light, first, on the relation between a country's language policy and its socioeconomic performance, and second—and this does not seem to have been done before—, on the relation between a country's communicative patterns and its socioeconomic performance. I will formulate several hypotheses that different types of countries will differ in their socioeconomic performances and verify these by way of accepted statistical tests¹. The paper is meant to be inceptive and suggestive rather than fully conclusive.

Readers not interested in the exact statistical processes may go on with Sections 2 and 3, but then skip Sections 4 through 8, and rather jump immediately to Section 9, "Conclusions and Perspectives", where all hypotheses are listed again, together with brief statements on whether they can be verified or not.

2. Socioeconomic Parameters

Socioeconomic data abound. In order to relate to the combat against poverty and social exclusion, a mix of socioeconomic aspects seems to be called for. One wide-spread socioeconomic index is the Human Development Index (HDI). It was developed for the UN in 1990. It combines data on life expectancy, education and per-capita gross domestic product

¹ Strictly speaking in statistical terms, what is tested is the probability of obtaining a statistic at least as extreme as the one that was actually observed, assuming that the null hypothesis is true. The null hypothesis is the default view that there is no relationship between two measured phenomena. The aforesaid probability is expressed in the p-value. The lower the p-value, the less likely the observed result is if the null hypothesis is true, and consequently the more significant the result is in the sense of statistical significance. For $p < 0.05$, I will use the phrase "weakly significant"; for $p < 0.01$, I will use the phrase "strongly significant", for $p < 0.001$, I will use the phrase "extremely significant". For statistical guidance I relied on Albert/Koster (2002) and, as a supplement, on Gries (2008).

and strives for an empirically based differentiation between developed, developing and underdeveloped countries. An alternative index, created in 2006, is the Happy Planet Index (HPI). It was designed to integrate the aspect of sustainability. It respects subjective life satisfaction, life expectancy at birth, and ecological footprint per capita. These are the two indexes that will be related to different sociolinguistic parameters in this contribution.

As a supplement to the HDI, the UN also developed the Human Poverty Index for Developing Countries, which takes into account the probability at birth of not surviving to age 40, adult illiteracy rate, the average of population without sustainable access to improved water supply, and children underweight, and the Human Poverty Index for Selected OECD Countries, which takes into account the probability at birth of not surviving to age 60, the percentage of adults lacking functional literacy skills, the percentage of population below the income poverty line and the rate of long-term unemployment. Dorling/Newman/Barford (2008: 189) have combined both tests. Their results will be used for one of the correlations.

3. Sociolinguistic Parameters

The social function of language encompasses at least two issues: first, the status of language in society; second, the sociocultural rules expressed through language. The latter aspect is part of (cross-cultural) pragmatics. It seems suitable, at least provocative in a positive sense, to look at socioeconomic parameters through both of these “sociolinguistic” lenses. The linguistic parameters that will therefore be used in this article are the following:

- a country’s language policy for official contexts (“official language regulation”)
- a country’s communicative patterns as defined by Edward T. Hall, Geert Hofstede, Richard D. Lewis, and the team of Terri Morrison and Wayne Conaway.

3.1. National Language Policies for Official Contexts

All the 197 countries of the world recognized at the time of gathering statistical data (summer 2010) were classified into 12 types of “language regulations for official contexts”². The classification is based on the *de facto* language policy, which in some cases deviates from *de jure* regulations or goals. The classification is based on the country information provided in Lewis (2009), Leclerc (1999ff.), and the language profile articles labeled “excellent” or “good” in the English, German, Spanish, Italian and French version of the Internet encyclopedia Wikipedia (in most cases, the relevant data in the Wikipedia articles refer to Lewis [2009] or a previous edition). In cases where data did not match, the more profoundly sourced and last updated information was accepted. The prominence of the various types is shown in Figure 1; the appendix lists all countries and indicates their policy type.

² Coulmas (1992), in his book, contrasts countries without distinguishing different statuses of the languages spoken in a country. For this article, I have consciously taken into account languages used in official contexts. They enjoy specific national protection, and it is national socioeconomic data that they will be related to in this contribution.

type	definition	no. of countries	% of countries
A.	two or more autochthonous ³ official languages, regionally not strictly separated	15	7.6
B.	two or more autochthonous state-wide official languages, regionally strictly separated	2	1.0
C.	one or two supraregional/state-wide autochthonous official languages plus several regional official languages	15	7.6
D.	one or more autochthonous state-wide official languages + 1 or more allochthonous official language(s) (i.e. native for less than 20% of population, only descendants of former colonizers)	34	17.3
E.	one allochthonous ⁴ official language (i.e. native for less than 20% of the population, only descendants of former colonizers)	36	18.3
F.	one autochthonous official language in mutually interchangeable varieties	1	0.5
G.	one language of one ethnic group that is represented by only 20-50%	3	1.5
H.	two languages of ethnic groups that are represented by less than 20%	1	0.5
I.	mixture of g and e	4	2.1
J.	one autochthonous state-wide official language (with less than 50% minorities) (incl. those countries where this holds only unofficially)	78	39.6
K.	one general official language + several indigenous languages permitted for indigenous people as official languages	1	0.5
L.	more than one allochthonous official languages (i.e. native for less than 20% of the population, only descendants of former colonizers)	7	3.6
sum		197	100.0

Fig. 1: Types of Official Language Policies

As already said, the appendix lists the type of language for all countries. This categorization will be relevant when have a look at TOP20 lists of socioeconomic performance (Happy Planet Index, Human Development Index, Human Poverty Index).

3.2. National Communicative Patterns

Different people have different communicative skills. Communicative behavior can influence an economic exchange between individuals. But communicative behavior also varies from culture to culture. Consequently, it makes sense to check whether the socioeconomic

³ Language are called *autochthonous* if they are indigenous in a territory, if they have historically always existed on that territory. If they were brought to the territory comparatively recently (predominantly in the period of colonialization), they are termed *allochthonous*.

⁴ Cf. preceding footnote.

achievements of countries is related to their communicative strategies, or values. Prototypical representatives of communicative types of culture will be selected for these tests. The communicative types that we will focus on are presented in this section. When we speak of the communicative character of countries, we actually refer to the communicative character of the vast majority of cultures in these countries.

3.2.1. Classifications by Edward T. Hall and Geert Hofstede

As early as 1950, the great American anthropologist Edward T. Hall, who died in 2009 at the age of 95, introduced the following distinction (e.g. Hall 1976):

low-context communication (use of a rather direct style, person-oriented communication, characterized by self-projection and loquacity)



high-context communication (use of a rather indirect style, status-oriented communication, characterized by reservation and silence).

The classification of countries based on this distinction is rooted in ethnographic observation. A frequently cited questionnaire-based classification that closely resembles this distinction of “low context” and “high context” is the one by the Dutch sociologist Geert Hofstede (2000). Since the 1980’s, he has been using the categories “individualism” and “collectivism”. This is nowadays the dominant distinction in cross-cultural comparisons. In individualistic countries people prefer a rather direct style and an analytic style (= focus on details and step-by-step processes), they mention important points before an explanation or illustration in an argument, they base decisions on compromise or the majority’s vote. In collectivistic countries a rather indirect style and a synthetic style (= holistic, global perspective on things) are used, explanations and illustrations are mentioned before the core point of an argument, decisions are finalized after consensus. Hofstede also set up further antonymies, which are less relatable to communicative behavior, though.

3.2.2. Classifications by Richard D. Lewis

Other distinctions, which are more neatly connectable to communicative behavior, have been provided by Richard D. Lewis (2008). He divides a large selection of countries into two polar categories, the first of which resembles Hall’s distinction of “low-context context” and “high-context cultures”:

(a) **data-oriented** cultures (which typically do research to produce the majority of information that is then reacted on)



dialog-oriented countries (which typically get the majority of information through personal information networks)

(b) **linear-active** countries (where people do one thing at a time, talk half the time, are unemotional and direct, partly conceal feelings, confront with logic, prefer truth over diplomacy, rarely interrupt, stick to facts, see speech for information, talk at medium speed, think briefly before speaking, are result-oriented, make compromises to achieve a deal, value the written word, give quick responses to written communication and like short pauses between speech turns)



multi-active countries (where people do several things at once, talk most of the time, are emotional, confront emotionally, often interrupt, value feelings more than facts, handle truth flexibly, see speech for expressing opinions, talk fast, let their speech lead thought, are relationship-oriented, try to win an argument, value the spoken word, respond to letters slowly due to their preference for spoken messages, accept overlapping speech)



reactive countries (where people react to an interlocutor's action, listen most of the time, are unemotional and indirect, conceal feelings, do not interrupt, see statements as promises, prefer diplomacy over truth, see speech as a tool to promote harmony, talk slowly, are harmony-oriented, make compromises for future relations, value face-to-face contact, respond slowly to letters due to the need for lateral clearances, like long pauses between speech turns).

3.2.3. A Classification by Morrison and Conaway

Morrison and Conaway (2006), finally, group their selection of 60 countries, among other things, according to what counts as a good argumentative structure. For some good evidence is rooted in objective **facts**, for others in ideologies (or **faith**), for still others in emotion (or **feelings**).

4. A Country's Language Policy and Its Socioeconomic Performance

4.1. Hypotheses and Selected Method

One of the recurrent language policy questions that people ask a linguist is whether it is in the long run economically better to promote monolingualism (at the expense of cultural diversity) or to promote multilingualism (at the expense of budgets for language teaching/learning and translations). Jonathan Pool (1972) and Florian Coulmas (1992, especially 23-26) were probably the first to delve more deeply into contrastive macroeconomic linguistics. Pool connected the gross domestic product per capita with the size of the largest native-language community (as an indicator of the degree of linguistic homogeneity). Coulmas chose to connect the number of languages (both those of official status and those of non-official status) with the per-capita income of 18 countries. In his analysis, Pool (1972: 222) concludes that a linguistically highly heterogeneous country is underdeveloped or semideveloped and a linguistically highly homogeneous country is highly developed country⁵. Coulmas observes a tendency that extreme multilingualism (over 30) is correlated with lower per-capita income. Taking a first look at Coulmas's table, there seems to be no clear difference between monolingual states (of which, however, he only includes two) and states with up to 10 languages. The per-capita income, however, is only one criterion. We will take two indexes that represent a mix of data: HDI combines the per-capita GDP with other criteria, and the

⁵ On the interpretation of Pool's and this type of analysis see Fasold (1984, especially 5-31).

Happy Planet Index mixes still other parameters. Moreover, Coulmas takes into account not only official languages, but all kinds of more or less widespread languages. However, for our purpose languages that are not used in official, but only in private or semi-private contexts shall not interest us here, as our parameters of relation are national socioeconomic data. To get a first impression, the following basic hypotheses were set up:

Hypothesis 1: Countries with a monolingual policy for official contexts show different performances on the Human Development Index than countries with a multilingual policy for official contexts.

Hypothesis 2: Countries with a monolingual policy for official contexts show different performances on the Happy Planet Index than countries with a multilingual policy for official contexts.

Hypothesis 3: Countries with a monolingual policy for official contexts show different performances on the Human Poverty Index than countries with a multilingual policy for official contexts.

To test this, one way would be to note down the policy and the indexes for each country (or a selection of the 197 countries) and to carry out one-factor ANOVAs with 12 (very differently large and very unevenly distributed) categories and a succeeding Newman-Keuls test. Another way is to have a look at just the countries with the best performances. Since this contribution is inspired by the idea of combating poverty and social exclusion, this is the path pursued here. We can thus count how often a certain country type (monolingual or multilingual) appears in the TOP20 list of the indexes analyzed. The statistical test that must then be used is a chi-square test.

4.2. Data Presentation

The TOP20 lists yield the following data necessary for the chi-square test.

Data Record #1: TOP20 Human Development Index (HDI)

code	descriptor	no. of countries	%	expected score	observed score
I	monolingual (B + E + F + K + J)	121	61.42	12.30	13.00
II	multilingual (A + C + D + L)	76	38.58	7.70	7.00
		197	100.00	20.00	20.00

Fig. 2: Data Record #1: TOP20 Human Development Index (HDI)

Data Record #2: TOP20 Happy Planet Index (HPI)

code	descriptor	no. of countries	%	expected score	observed score
I	monolingual (B + E + F + K + J)	121	61.42	12.30	14.00
II	multilingual (A + C + D + L)	76	38.58	7.70	6.00
		197	100.00	20.00	20.00

Fig. 3: Data Record #2: TOP20 Happy Planet Index (HPI)

Data Record #3: TOP20 Human Poverty Index

code	descriptor	no. of countries	%	expected score	observed score
I	monolingual (B + E + F + K + J)	121	61.42	12.30	12.00
II	multilingual (A + C + D + L)	76	38.58	7.70	8.00
		197	100.00	20.00	20.00

Fig. 4: Data Record #3: TOP20 Human Poverty Index

4.3. Test Results

Based on the TOP20 lists of the Human Development Index and the Human Poverty Index as given in Dorling/Newman/Barford (2008: 188-189) and based on the TOP20 list of the Happy Planet Index (HPI) as given by Abdallah et al. (2009), three chi-square tests were carried out to the two-tailed probability value (p-value) of the corresponding null hypotheses. The test results are the following:

test	chi-square	df	two-tailed p value	statistical significance
1	0.103	1	0.7477	none
2	0.019	1	0.8904	none
3	0.610	1	0.4347	none

Fig. 5: Results of Chi-Square Tests

The results do not show statistical significance.

5. Hofstede's Individualism/Collectivism-Distinction and Socioeconomic Performance

5.1. Hypotheses and Selected Method

This section marks the beginning of relating socioeconomic performance with communicative patterns.

Hypothesis 4: The average HPI of individualistic countries differs from the average HPI of collectivistic countries.

Hypothesis 5: The average HDI of individualistic countries differs from the average HDI of collectivistic countries.

Since the opposition between individualistic countries and collectivistic countries is a gradual one, not a binary one, I decided to include the ten countries closest to the extreme individualistic pole (120 points on Hofstede's scale) and the ten countries closest to the extreme collectivistic pole (0 points on Hofstede's scale) and to note down the HPI and HDI indexes for these countries.

As for the HPI data, the populations are normally distributed (as shown by a Shapiro-Wilk test) and have equal variance (as shown by an F-test: $F = 0.49$; $df_1 = 9$; $df_2 = 9$). Therefore, a two-sample (unpaired) two-tailed t-test can be chosen.

As for the HDI data, the populations are not normally distributed (as shown by a Shapiro-Wilk test), but have equal variance (as shown by an F-test: $F = 0$; $df1 = 9$; $df2 = 9$). Therefore, a Mann-Whitney U Test is used.

5.2. Data Presentation

	HPI	HDI
INDIVIDUALISTIC		
US	30.73	0.951
Australia	36.64	0.962
UK	43.31	0.946
Netherlands	50.60	0.953
New Zealand	36.21	0.943
Italy	44.02	0.941
Belgium	45.36	0.946
Denmark	35.47	0.949
France	43.86	0.952
Sweden	47.99	0.956
<i>mean</i>	<i>41.42</i>	<i>0.950</i>
COLLECTIVISTIC		
Korea	44.43	0.921
Peru	54.37	0.773
Costa Rica	76.12	0.846
Indonesia	58.92	0.728
Pakistan	55.56	0.551
Colombia	66.10	0.791
Venezuela	52.49	0.792
Panama	57.37	0.812
Ecuador	55.46	0.772
Guatemala	68.37	0.689
<i>mean</i>	<i>52.08</i>	<i>0.699</i>

Fig. 6: HPI and HDI and Individualism/Collectivism

5.3. Test Results

The results of the t-test relating to the HPI are these:

Pooled standard deviation: 7.7935

Pooled df: 18

95% confidence interval for the difference (-24.8223 , -10.1777)

t-value = -5.021

Population 1 \neq Population 2: $p < .00001$

Population 1 $>$ Population 2: $p = >.99999$

Population 1 $<$ Population 2: $p < .00001$

That the HPI of individualistic countries is lower than the HPI of collectivistic countries is statistically extremely significant.

The results of the Mann-Whitney Test for the HDI are these:

$U = 0$

$z = 3.14$

p (two-tailed) = 0.0002

The results are statistically extremely significant.

6. Lewis's Data/Dialog-Orientation and Socioeconomic Performance

6.1. Hypotheses and Selected Method

As to the distinction between data-oriented and dialog-oriented countries, Lewis (2008: 49) remarks: "Most of the successful economies, with the striking exception of Japan, are in data-oriented cultures." It is unclear, though, how Lewis defines *successful*. For the following hypotheses, we will test whether dialog-oriented countries achieve a lower average HPI and HDI than data-oriented countries.

Hypothesis 6a: The average HPI of dialog-oriented countries differs from the average HPI of data-oriented countries.

Hypothesis 6b: The average HPI of dialog-oriented countries is worse than the average HPI of data-oriented countries.

Hypothesis 7a: The average HDI of dialog-oriented countries differs from the average HDI of data-oriented countries.

Hypothesis 7b: The average HDI of dialog-oriented countries is worse than the average HDI of data-oriented countries.

Since the opposition between individualistic data-oriented and dialog-oriented countries is a gradual one, not a binary one, I decided to include 10 countries for each category whose intensities of the feature are close to the corresponding extreme end.

With respect to the HPI, the populations are normally distributed (as shown by a Shapiro-Wilk test) and have equal variance (as shown by an F-test: $F = 1.62$; $df_1 = 9$; $df_2 = 9$). Therefore, a two-sample (unpaired) two-tailed t-test is chosen. With respect to the HDI, the populations are not normally distributed (as shown by a Shapiro-Wilk test), but have equal variance (as shown by an F-test: $F = 0.77$; $df_1 = 9$; $df_2 = 9$). Therefore, a Mann-Whitney U Test is used.

6.2. Data Presentation

	HPI	HDI
DIALOG-ORIENTED		
Argentina	58.95	0.869
Brazil	61.01	0.800
Chile	49.72	0.867
Egypt	60.32	0.708
France	43.86	0.952
Greece	37.58	0.926
Italy	44.02	0.941
Mexico	55.58	0.829
Portugal	37.46	0.897
Spain	43.19	0.949
<i>mean</i>	<i>49.17</i>	<i>0.874</i>
DATA-ORIENTED		
Canada	39.40	0.961
Denmark	35.47	0.949
Finland	47.23	0.952
Germany	48.07	0.935
New Zealand	36.21	0.943
Norway	40.36	0.968
South Africa	29.69	0.674
Sweden	47.99	0.956
Switzerland	48.05	0.955
USA	30.73	0.951
<i>mean</i>	<i>40.32</i>	<i>0.924</i>

Fig. 7: HPI and HDI and Argument Orientation

6.3. Test Results

The results of the t-test for the HPI are these:

Pooled standard deviation: 8.2869

Pooled df: 18

95% confidence interval for the difference (1.0631 , 16.6349)

t-value = 2.3877

Population 1 \neq Population 2: p = 0.0282

Population 1 > Population 2: p = 0.9859

Population 1 < Population 2: p = 0.0141

The fact that the average HPIs differ is statistically weakly significant.

The results of the Mann-Whitney Test for the HDI are these:

U = 82

z = -2.38

p (two-tailed) = 0.0173

The results are extremely significant.

7. Lewis's Activity/Reactive-Grid and Socioeconomic Performance

7.1. Hypotheses and Selected Method

Hypothesis 8: The differences in the average HPI between linear-active, multi-active and

reactive countries are statistically significant.

Hypothesis 9: The differences in the average HDI between linear-active, multi-active and reactive countries are statistically significant.

Since the three categories are gradual ones, which Lewis locates in a triangle, I decided to select ten countries whose intensity of the trait is close to the extreme corner points in the triangle. Since we are dealing with more than two groups here, a t-test can not be applied. A one-factor ANOVA is used instead.

7.2. Data Presentation

	HPI	HDI
LINEAR-ACTIVE		
Austria	47.69	0.948
Czech Republic	38.31	0.891
Germany	48.07	0.935
Netherlands	50.60	0.953
New Zealand	36.21	0.943
Sweden	47.99	0.956
Norway	40.36	0.968
Switzerland	48.05	0.955
UK	43.31	0.946
USA	30.73	0.951
<i>mean</i>	<i>43.13</i>	<i>0.945</i>
MULTI-ACTIVE		
Argentina	58.95	0.869
Brazil	61.01	0.800
Chile	49.72	0.867
Ghana	37.10	0.553
Greece	37.58	0.926
Mexico	55.58	0.829
Portugal	37.46	0.897
Slovakia	43.52	0.863
Spain	43.19	0.949
Tanzania	17.79	0.467
<i>mean</i>	<i>44.19</i>	<i>0.802</i>
REACTIVE		
Cambodia	42.34	0.598
China	57.11	0.777
Finland	47.23	0.952
Hong Kong	41.60	0.937
Japan	43.25	0.953
Korea	44.43	0.921
Laos	57.34	0.601
Singapore	48.24	0.922
Thailand	50.90	0.781
Vietnam	66.52	0.733
<i>mean</i>	<i>49.90</i>	<i>0.818</i>

Fig. 8: HPI and HDI and Activity Degree

7.3. Test Results

The results of the ANOVA with respect to the HPI are the following:

source of variation	sum of squares	df	mean squares	F	p
between gr	264.800	2	132.400	1.444	0.254
error (w/in gr)	2,475.000	27	91.660		
total	2,740.000	29			

Fig. 9

Since p is above 0.05, the differences are not statistically significant.

The results of the ANOVA with respect to the HDI are the following:

source of variation	sum of squares	df	mean squares	F	p
between gr	0.1224	2	6.1216E-02	3.985	0.030
error (w/in gr)	0.4148	27	1.5363E-02		
total	0.5372	29			

Fig. 10

Since p is below 0.05, the differences are statistically weakly significant. In order to check which of the inter-group differences are important, a post-ANOVA Tukey HSD test was carried out. This test reveals that the differences between the mean of linear-active countries and the mean of multi-active countries are statistically weakly significant (i.e. statistically significant at the 0.05 level ($HSD_{.05} = 0.143$; $k = 3$; $df_{wg} = 16$; $Q_{.05} = 3.65$)).

8. The Faith/Facts/Feelings-Orientation and Socioeconomic Performance

8.1. Hypotheses and Selected Method

Hypothesis 10: The differences in the average HPI between “faith” countries, “facts” countries and “feelings” countries are statistically significant.

Hypothesis 11: The differences in the average HDI between “faith” countries, “facts” countries and “feelings” countries are statistically significant.

Since the three categories are often blended in countries, I decided to select countries that Morrison and Conaway describe as pure representatives of the traits mentioned. However, of the 60 countries investigated, only three are pure representatives of the “faith/ideology” type. Since we are dealing with more than two groups here, a t-test can not be applied. An ANOVA is used instead.

8.2. Data Presentation

	HPI	HDI
FAITH		
Denmark	35.47	0.949
Norway	40.36	0.968
Egypt	60.32	0.708
<i>mean</i>	<i>45.38</i>	<i>0.875</i>
FACTS		
Austria	47.69	0.948
Belgium	45.36	0.946
Germany	48.07	0.935
Hungary	38.86	0.874
France	43.86	0.952
Netherlands	50.60	0.953
United Kingdom	43.31	0.946
USA	30.73	0.951
Australia	36.64	0.962
Canada	39.40	0.961
<i>mean</i>	<i>42.45</i>	<i>0.943</i>
FEELINGS		
Greece	37.58	0.926
Italy	44.02	0.941
Portugal	37.46	0.897
Spain	43.19	0.949
Japan	43.25	0.953
Mexico	55.58	0.829
Vietnam	66.52	0.733
Brazil	61.01	0.800
Colombia	66.10	0.791
<i>mean</i>	<i>50.52</i>	<i>0.869</i>

Fig. 11: HPI and HDI and Argument Values

8.3. Test Results

The results of the ANOVA with respect to the HPI are the following:

source of variation	sum of squares	df	mean squares	F	p
between gr	309.900	2	155.000	1.637	0.221
error (w/in gr)	1,798.000	19	94.630		
total	2,108.000	21			

Fig. 12: HPI ANOVA

Since p is above 0.05, the differences are not statistically significant.

The results of the ANOVA with respect to the HDI are the following:

source of variation	sum of squares	df	mean squares	F	p
between gr	2.87E-002	2	1.4366E-02	2.691	0.094
error (w/in gr)	0.1014	27	5.3382E-03		
total	0.1302	29			

Fig. 13: HDI ANOVA

Since p is above 0.05, the differences are not statistically significant. With respect to the HPI and the HDI, it can, as of yet, not be said whether “faith”, “facts” and “feelings” countries perform better.

9. Conclusions and Perspectives

Let us sum up the results of the various hypotheses again and comment on them. The first hypotheses dealt with language policies for official contexts. The other ones deal with communicative patterns. The comments will also include perspectives for further research.

Hypothesis	probability
1: Countries with a monolingual policy for official contexts show different performances on the Human Development Index (HDI) than countries with a multilingual policy for official contexts.	no
2: Countries with a monolingual policy for official contexts show different performances on the Happy Planet Index (HPI) than countries with a multilingual policy for official contexts.	no
3: Countries with a monolingual policy for official contexts show different performances on the Human Poverty Index than countries with a multilingual policy for official contexts.	no
4: The average HPI of individualistic countries differs from the average HPI of collectivistic countries.	extreme
5: The average HDI of individualistic countries differs from the average HDI of collectivistic countries.	extreme
6a: The average HPI of dialog-oriented countries differs from the average HPI of data-oriented countries.	weak
6b: The average HPI of dialog-oriented countries is worse than the average HPI of data-oriented countries.	falsified
7a: The average HDI of dialog-oriented countries differs from the average HDI of data-oriented countries.	extreme
7b: The average HDI of dialog-oriented countries is worse than the average HDI of data-oriented countries.	extreme
8: The differences in the average HPI between linear-active, multi-active and reactive countries are statistically significant.	none
9: The differences in the average HDI between linear-active, multi-active and reactive countries are statistically significant.	weak

Hypothesis	probability
10: The differences in the average HPI between “faith” countries, “facts” countries and “feelings” countries are statistically significant.	no
11: The differences in the average HDI between “faith” countries, “facts” countries and “feelings” countries are statistically significant.	no

Fig. 14: Statistical Probabilities of Hypotheses

Ad Hypotheses 1 to 3: A chi-square test working with a certain index alone does unfortunately not lead to any results expressing statistical significance regarding the question whether deviations from the expected means are accidental. A chi-square test that works with 72 socioeconomic parameters is currently under review (cf. Grzega [ms.]). Already at this point it can be revealed that this test working with 72 parameters and a more refined look at the categories leads to the conclusion that differences are statistically significant and that language policy C—one or two supraregional/state-wide autochthonous official languages plus several regional official languages—ranks highest.

Ad Hypotheses 4 and 5: On the average, **individualistic countries achieve a higher Human Development Index** (which covers life expectancy, education and per-capita gross domestic product), **collectivistic countries achieve a higher Happy Planet Index** (which covers subjective life satisfaction, life expectancy at birth, and ecological footprint per capita). The “we” view of collectivistic countries also seems to include our planet.

Ad Hypotheses 6a, 6b, 7a and 7b: On the average, **data-oriented countries achieve a higher Human Development Index, while dialog-oriented countries achieve a higher Happy Planet Index**. Thus, Lewis’s assumption that data-oriented countries are economically more successful clearly depends on what your (socio)economic goals are. This, again, shows that suggestions for communicative behavior seem not to be generalizable. Either a larger number of socioeconomic aspects that represent goals all people would agree needs to be incorporated in an index or it is shown for a larger of socioeconomic aspects separately.

Ad Hypothesis 9: The results suggest that **linear-active countries perform better with respect to the HDI than multi-linear countries**. It seems that the criteria of linear-active countries as listed in Section 3 (such as doing one thing at a time, being unemotional and direct, preferring truth over diplomacy, sticking to facts, being result-oriented, making compromises to achieve a deal etc.) lead to more success regarding the economic aspects covered by the HDI (life expectancy, education and per-capita gross domestic product).

Again, the results show that the economic success of communicative strategies depends on how economic success is defined. Further analyses will have to integrate more socioeconomic parameters and/or to create indexes that include more socioeconomic parameters and then correlate them with language policies and communicative characteristics.

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Statistical websites used to determine the p values:

- chi-square test: <http://graphpad.com/quickcalcs/chisquared1.cfm>
- t-test: <http://www.usablestats.com/calcs/2samplet>
- ANOVA: http://www.physics.csbsju.edu/stats/anova_NGROUP_NMAX_form.html

- Mann-Whitney U test: <http://elegans.swmed.edu/~leon/stats.html>
- Tukey HSD test: <http://faculty.vassar.edu/lowry/ch14pt2.html>

Appendix: Language Policies

type	definition
A.	two or more autochthonous official languages, regionally not strictly separated
B.	two or more autochthonous state-wide official languages, regionally strictly separated
C.	one or two supraregional/state-wide autochthonous official languages plus several regional official languages
D.	one or more autochthonous state-wide official languages + 1 or more allochthonous official language(s) (i.e. native for less than 20% of population, only descendants of former colonizers)
E.	one allochthonous official language (i.e. native for less than 20% of the population, only descendants of former colonizers)
F.	one autochthonous official language in mutually interchangeable varieties
G.	one language of one ethnic group that is represented by only 20-50%
H.	two languages of ethnic groups that are represented by less than 20%
I.	mixture of g and e
J.	one autochthonous state-wide official language (with less than 50% minorities) (incl. those countries where this holds only unofficially)
K.	one general official language + several indigenous languages permitted for indigenous people as official languages
L.	more than one allochthonous official languages (i.e. native for less than 20% of the population, only descendants of former colonizers)

Afghanistan	A
Albania	J
Algeria	D
Andorra	G
Angola	E
Antigua and Barbuda	E
Argentina	J
Armenia	J
Australia	J
Austria	C
Azerbaijan	J
Bahamas	E
Bahrain	J
Bangladesh	J
Barbados	E
Belarus	A
Belgium	B
Belize	E

Benin	E
Bhutan	I
Bolivia (Plurinational State of)	C
Bosnia and Herzegovina	A
Botswana	D
Brazil	J
Brunei Darussalam	A
Bulgaria	J
Burkina Faso	E
Burundi	D
Cambodia	J
Cameroon	L
Canada	A
Cape Verde	E
Central African Republic	I
Chad	I
Chile	J
China	C
Colombia	C
Comoros	D
Congo	E
Costa Rica	J
Côte d'Ivoire	E
Croatia	J
Cuba	J
Cyprus	A
Czech Republic	J
Democratic People's Republic of Korea	J
Democratic Republic of the Congo	E
Denmark	J
Djibouti	L
Dominica	D
Dominican Republic	J
Ecuador	J
Egypt	J
El Salvador	J
Equatorial Guinea	L
Eritrea	E
Estonia	J
Ethiopia	G
Fiji	D
Finland	D
France	J
Gabon	E
Gambia	E
Georgia	J

Germany	C
Ghana	E
Greece	J
Grenada	E
Guatemala	C
Guinea	E
Guinea-Bissau	E
Guyana	E
Haiti	D
Honduras	J
Hungary	J
Iceland	J
India	C
Indonesia	J
Iran (Islamic Republic of)	J
Iraq	C
Ireland	A
Israel	A
Italy	C
Jamaica	E
Japan	J
Jordan	J
Kazakhstan	A
Kenya	A
Kiribati	D
Kuwait	J
Kyrgyzstan	A
Lao People's Democratic Republic	J
Latvia	J
Lebanon	D
Lesotho	D
Liberia	E
Libyan Arab Jamahiriya	J
Liechtenstein	J
Lithuania	J
Luxembourg	D
Madagascar	D
Malawi	E
Malaysia	J
Maldives	J
Mali	E
Malta	D
Marshall Islands	D
Mauritania	J
Mauritius	D
Mexico	C

Micronesia (Federated States of)	E
Monaco	J
Mongolia	J
Montenegro	J
Morocco	D
Mozambique	E
Myanmar	J
Namibia	E
Nauru	D
Nepal	J
Netherlands	J
New Zealand	A
Nicaragua	C
Niger	D
Nigeria	D
Norway	F
Oman	J
Pakistan	L
Palau	D
Panama	J
Papua New Guinea	L
Paraguay	A
Peru	C
Philippines	D
Poland	J
Portugal	J
Qatar	J
Republic of Korea	J
Republic of Moldova	J
Romania	J
Russian Federation	C
Rwanda	D
Saint Kitts and Nevis	E
Saint Lucia	D
Saint Vincent and the Grenadines	E
Samoa	D
San Marino	J
Sao Tome and Principe	J
Saudi Arabia	J
Senegal	E
Serbia	J
Seychelles	D
Sierra Leone	E
Singapore	D
Slovakia	J
Slovenia	J

Solomon Islands	E
Somalia	D
South Africa	A
Spain	C
Sri Lanka	A
Sudan	D
Suriname	J
Swaziland	D
Sweden	J
Switzerland	B
Syrian Arab Republic	J
Tajikistan	J
Thailand	J
The former Yugoslav Republic of Macedonia	J
Timor-Leste	D
Togo	E
Tonga	D
Trinidad and Tobago	E
Tunisia	J
Turkey	J
Turkmenistan	J
Tuvalu	D
Uganda	L
Ukraine	J
United Arab Emirates	J
United Kingdom	J
United Republic of Tanzania	L
United States of America	C
Uruguay	J
Uzbekistan	J
Vanuatu	I
Venezuela (Bolivarian Republic of)	K
Viet Nam	J
Yemen	J
Zambia	E
Zimbabwe	E

IN ADDITION:

SPECIAL TERRITORIES OR NAMES

South Korea	J
North Korea	J
Macedonia	J
Hong Kong	D
Greenland	E
Taiwan	G
Vatican	H

Gaza & West Bank
Niue

J
D

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