THE EASTERLIN ILLUSION
Economic growth *does* go with greater happiness[1]

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ABSTRACT
The 'Easterlin Paradox' holds that economic growth in nations does not buy greater happiness for the average citizen. This thesis was advanced in the 1970s on the basis of the then available data on happiness in nations. Later data have disproved most of the empirical claims behind the thesis, but Easterlin still maintains that there is no long-term correlation between economic growth and happiness.

This last claim was tested using the time trend data available in the World Database of Happiness, which involve 1531 data points in 67 nations that yield 199 time-series ranging from 10 to more than 40 years. The analysis reveals a positive correlation between GDP growth and rise of in happiness in nations. Both GDP and happiness have gone up in most nations, and average happiness has risen more in nations where the economy has grown the most; r =+0.21 p< 05. On average a 1% growth in income per capita per year was followed by a rise in average happiness on scale 0-10 of 0.00335; thus a gain in happiness of a full point would take 60 years with an annual economic growth of 5%.

1 INTRODUCTION

The economy has grown over the last decades in most contemporary nations and economic growth is likely to continue in the future. Though generally welcomed, there are also reservations about this ongoing economic growth. Over the ages there have been warnings against the lures of material wealth and since the 1960's there has also been growing concern about sustainability issues. In this context the question arises as to what increasing wealth does to human wellbeing and that

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question has become a subject of empirical research.

1.1 The Easterlin paradox

In 1974 Richard Easterlin published the seminal paper 'Does economic growth improve the human lot?' His answer was *no*. This conclusion was based on the then available survey data on happiness. Comparing across nations Easterlin noted that people do not live happier in rich nations than in poor nations and comparing across time he observed no rise in average happiness in the USA between 1944 and 1970, in spite of impressive economic growth in that period.

This finding came to be known as the 'Easterlin paradox' and is commonly seen as the start of 'Happiness Economics'. It prompted a stream of scientific publications. A search in Google Scholar on 'Easterlin paradox' yields more than 4500 hits. Most of these publications are about explanations for the phenomenon, but a considerable body of literature is on whether it really exists.

1.2 Explanations for the paradox

Though Easterlin found no higher happiness in rich nations than in poor ones, he did find that within nations relatively rich individuals tend to be happier than their poorer compatriots. This brought him to an explanation in terms of interpersonal comparison, in line with the sociological theory of 'relative deprivation', which Stouffer (1949) uses to explain dissatisfaction with rank among American soldiers. In the same vein Easterlin assumes that satisfaction with life depends on interpersonal comparison and since reference persons are typically compatriots, the distance to these is about the same in rich and poor countries. Easterlin also mentions the role of rising aspiration and in this context refers to the notion of an 'hedonic treadmill', a term coined by Brickman and Campbell (1971), in these days[4].

Though these explanations seem plausible, it has appeared difficult to prove that they really apply. Over time the explanations have also lost plausibility. One reason is in comparison theory itself, because the related thesis of shifting standards predicts that the rich will end up equally happy as the poor, which is not the case. At a more basic level Veenhoven has cast doubt on the theory that happiness is a matter of comparison. In his view not all satisfaction is equally dependent on social comparison and satisfaction with domains such as rank and income more so than satisfaction with life as a whole. He argues that life satisfaction depends on affective experience rather than on cognitive comparison, and that affective experience depends on meeting innate 'needs' rather than learned 'wants' (Veenhoven 1991, 2009a).

The paradox has also been explained by the negative effects of economic growth. One line of argumentation is that economic growth involves high costs, such as the work it involves and the stresses of competition (e.g. Schorr 1993, 1999).

[4] The idea that average happiness in nations will not change over time also fits with the 'set-point' theory of happiness, which became popular some 10 years later (e.g. Lykken 1999)

Another negative effect is seen in the effects of economic prosperity on life style, such as increased consumption of high caloric food and too much television viewing. In this line Scitovski (1976) makes the case that mass-consumption does not really satisfy and Lane (2000) argues that the attendant culture of materialism tends to blind people to more solid sources of happiness.

1.3 Tests of the reality of the paradox

Rather than seeking for explanations, some scholars have inspected the evidence for the empirical claim. Ever more data on happiness in nations has become available over the years and this has gradually changed the picture.

1.3.1 Comparison across nations

The first piece of evidence presented by Easterlin is that average happiness does not differ between rich and poor nations. This claim is based on analyses of average happiness in a dozen countries against the log of income per head. Yet consideration of absolute income, rather than log-income radically changes the picture and yields a correlation of +.59 (Veenhoven 1989). Later studies in this line using an ever greater number of nations have also shown strong correlations and a recent study among 123 nations even found a strong correlation between average happiness and log-income across nations (Deaton 2008).

1.3.2 Comparison over time

Easterlin also used time series data on happiness and income per head to show that economic growth in the USA was not followed by a rise in average happiness. In later publications he presents longer time series on the US, which also show a pattern of stagnant happiness in spite of rising wealth (Easterlin 1995).

One line of criticism does not doubt these facts, but questions the interpretation. A positive effect of economic growth on happiness may have been suppressed by other developments. In this line Fisher (2008) has argued that in the USA happiness has stagnated because of a demonstrable deterioration in family life, which is unrelated to economic development. Likewise Phelps (2011) explains the stagnation of happiness as a response to a decline in the percentage of altruists in the population. In a similar vein Veenhoven (2007) suggests that the pains of cultural change have delayed a rise in happiness in Japan and South Korea.

Another approach is to check the empirical claim made by Easterlin as such: Is there really no correlation between economic growth and happiness in nations? One question in this context is whether average happiness in nations tends to remain at the same level, as Easterlin observed in the USA, or if rising happiness is more common. Another question is whether rising happiness goes together with economic growth.

Evidence of rising happiness in nations

Using time series data from 21 nations Hagerty and Veenhoven (2003) note that stagnant happiness is the exception rather than the rule, since average happiness

has gone up in most nations of the world, even in the USA, since the 1970s. In reply Easterlin (2005) argues that the evidence for rising happiness is still “fragmentary”. Yet evidence of rising happiness is mounting. In an analysis of the World Values Surveys Inglehart et al. (2008) found a pattern of rising happiness in nation since the 1980s.

Evidence of link with economic growth

The last question is whether this rise in happiness is due to economic growth. Hagerty and Veenhoven argue that rising happiness typically coincides with economic growth. Yet Easterlin replies that there is still no correlation between the *rate* of growth in GDP and happiness, at least when the analysis limits to cases of significant change (Easterlin 2007). Recently he has presented more data to support this view, based on an analysis of 54 countries (Easterlin et al. 2011).

In another recent paper (Easterlin & Angelesco 2009), Easterlin states that there are countries where economic growth and average happiness go hand in hand, but claims that this is a short term effect. On that basis he maintains that economic growth does not add to happiness in the long run.

Research findings on this matter are mixed so far. In an analysis of 15 European nations over the years 1973-2002 Bjornskov et. al. (2008) found no relation of happiness with economic growth as such, but observed growing happiness in response to accelerations of economic growth. Yet Graham (2011) reports a negative effect of growth rate in the last 5 years, which she calls the ‘paradox of unhappy growth’.

The best available data of the moment are reported by Diener et al. (2012), who use five yearly waves of the Gallup World Poll over the years 2007-2011 in 158 nations. Contrary to Easterlin’s thesis they found a positive effect of economic growth on happiness. One particular strong point of this study is that it considers both change in GDP per capita and change in household consumption. Another strong point is that they measured both cognitive contentment and affective experience. Remarkably this study did not provide evidence of a reference shift. A weak point of the study is that it covers only 5 years, so Easterlin can still maintain that economic growth does not add to happiness in the long run.

In this context the present study was focused on the long-term effects of economic growth on average happiness in nations and used time-series of at least ten years.

1.4 Aims of this study

This paper is about that last surviving empirical claim of the Easterlin Paradox, in it we consider whether economic growth in nations tends to go together with rising average happiness in the long run. We use the latest available data to answer the following research questions:

1) Did average happiness in nations remain at the same level over the last decade?

   a. Is the number of cases of rise in happiness about the same as the number of decline in happiness?
   b. If happiness risen, does this tendency manifest both in the short and the long run?
2) If happiness has risen, is its rise typically paralleled by economic growth?
   a. Has happiness risen more often in countries where the economy has grown than in countries where the economy has stagnated?
   b. Has average happiness risen *more* in nations where the economy has grown the *most*?
3) If rising happiness has tended to go together with economic growth, is this correlation similar across situations, or:
   a. Has the correlation existed only in the short-term and not in the long-term?
   b. Does the correlation exist only in poor nations, or also in rich nations?
   c. Is the correlation stronger in nations where economic growth is constant than in nations where economic growth has been erratic?
4) Do the correlations between happiness and economic growth differ across measures of happiness used?

Note the difference between questions 2a and 2b. Economic growth may add to happiness irrespective of its size; *some* growth may have a similar effect on happiness as *much* growth has. Tests of the Easterlin Paradox deal typically with question 2b, neglecting question 2a. Question 3 deals with contingencies. The Easterlin Paradox may apply to specific conditions and may not apply in other contexts. From a policy point of view it is important to know where it applies and where not. Question 4 is a test of robustness.

2 DATA

The data used in this study were obtained from the following sources.

2.1 Data on change of average happiness in nations

The data on average happiness in nations were taken from the World Database of Happiness (Veenhoven 2012a). This is a 'findings archive' on happiness in the sense of subjective enjoyment of one's life as a whole.

World Database of Happiness

The archive contains research findings yielded with measures that fit this concept of happiness as life-satisfaction. All acceptable indicators are included in the collection 'Measures of Happiness' (Veenhoven 2012b).

Most measures are single survey questions, such as the famous item 'Taking all together, how happy would you say you are these days, are you very happy, pretty happy or not too happy?´ This is just one of many acceptable measures of happiness. Survey questions have used different key words, such as 'satisfaction with life', and different response options, such as numerical scales. Next to these single questions there are also multiple questions, some of which constitute a 'balance scale'.

This diversity of measures of happiness used in the many surveys makes it difficult to compare scores and in particular to assess change in average happiness over time. The different measures of happiness are therefore sorted into 'equivalent' kinds, that is, questions that address happiness using the same keyword and a rating scale of the same length.

Research findings yielded using these acceptable measures of happiness are described in standard excerpts using standard terminology. Two kinds of findings are distinguished, 'distributional findings' and 'correlational findings'. Distributional findings denote how happy people are in a particular population and are often summarized in a measure of central tendency, typically the mean. Correlational findings are about things that go together with more or less happiness and summarized using measures of association, such as Pearson's correlation coefficient.

Distributional findings are sorted into findings among special publics, such as elderly persons, and findings in the general population. The findings on happiness in the general public are further subdivided by the kind of areas from which samples were drawn, such as 'regions', 'cities' and 'nations'. These latter findings are gathered in the collection of 'Happiness in Nations' (Veenhoven 2012c), which we used for this research.

Collection Happiness in Nations

To date (November 2012) the collection 'Happiness in Nations' contains 5204 findings on average happiness in 164 nations over the years 1946-2011. These

findings are sorted in three levels, one by nation, two within nations by kind of measure used and three within measures of the same kind by year.

An example of a 'nation page' is presented on Appendix A. This is the case of Argentina for which 35 distributional findings are available. These findings are sorted in blocks of equivalent survey questions. The first block consists of seven findings yielded by a survey question on how 'happy' one is, the answers to which were rated on a 4 step verbal response scale. The measure codes link to the precise text of that question and detailed information about the investigation can be found behind the 'i' icon.

Findings are sorted by year within each block, and this first block consists of the years 1981, 1991, 1995, 1999, 2002, 2005 and 2008. Looking at the blocks, see Appendix A, we see no clear trend in the responses to the question on happiness (measure type 111c) between 1981 and 2008, but a gradual change to the better in the responses to questions about life-satisfaction (measure type 121C and 122F) and the Cantril ladder (measure type 31D).

Identical questions

Within these blocks of equivalent questions there are still small differences in the wording of the lead question and/or response options. These variations are marked by the last symbol in the measure code. There are also variations in the timeframe addressed in the question, and these are marked with the third letter code, where 'c' stand for 'current', 'g' for in 'general' and 'u' is used for 'unclear'. These minor variations in the wording of questions can result in small differences in the mean scores and could as such overshadow the small changes in actual happiness over time. For that reason we limited our data set to time-series based on identical questions, that is, questions with the same measure code[5] .

In the above mentioned case of seven questions on how 'happy' one is in Argentina this meant that we considered only the five findings based on the question variant 'a'. Since the series of answers to question variant 'f' covered only 6 years, these were left out.

Transformation to common 0-10 numerical scale

We decided to use the transformed means, provided in the World Database of Happiness, for reasons of comparability. These transformed means are expressed on a common numerical scale ranging from 0 (low) to 10 (high). Scores on numerical response scales, shorter than this, are linearly stretched to give a range of 0-10. Scores on scales with verbal response options are transformed using a procedure first described by Thurstone (1927), in which experts rate the numerical value of response options. This procedure is described in more detail in Veenhoven 1993,

[5] We made an exception for the two variants of the question on life satisfaction used in the Latino Barometro, that is, the questions coded O-SLU-g-sq-v-4-b and O-SLu-g-sq-v-4-c, which differ slightly in the wording of the answer options. In this case we could use the first data yielded by the happiness Scale Interval Study (Veenhoven 2009b) in which native speakers rated the degree of happiness denoted by the answer categories in intervals on scale 0 to 10. This enabled us to transform the observed frequency distributions to a mean on a common scale.

chapter 7 ‘How the data are homogeneized’.

Series
On this basis we constructed several series of responses to identical questions on happiness in the same nation over time. We limited our analysis to series that covered a minimum of 10 years. We also limited the analysis to data gathered using probability samples. If the same question had been used in several surveys in the same year in the same country, we used the average response to that question. We did not require that a series involved more than two data points, though most series involve more.

This resulted in 199 time-series for average happiness in 67 nations, which together gave 1531 data points. The data matrix is presented in appendix B.

2.2 Data on economic growth in nations

Data on the economic performance of nations were taken from the World Bank (2012) online database. We considered both the income per capita in the year before each data point on happiness and the growth of that nation’s economy in the same year as a percentage of the GDP. Additional data for Taiwan were found in the library of the IMF (2012).

GDP p.c.
Income per capita for each of the years in each of the countries was expressed in US dollars.

Annual growth
Economic growth in nations was measured using the yearly growth of the GDP as a percentage measured in local currency.

These data did not cover all the periods for which we had data on happiness. One reason is that the World Bank does not provide data for the years before 1960. Another reason is that some nations have only emerged recently, for example Croatia, a nation which was born from the death of former ‘Great’ Yugoslavia in 1991.

3 METHODS

The following methods were used to find answers to the questions set out in section 1.4.

3.1 Assessing change of average happiness over time

Question 1 dealt with whether average happiness has typically remained at the same level, or has risen in most nations. We answered that question in two ways. We first assessed change in each of the 199 series of responses to the same question on happiness in the same country. Next we computed the average change over all series in the same country.

3.1.1 Change of average happiness in series of identical questions

We regressed happiness against year in all the 199 time series. The resulting regression coefficients were used to indicate the yearly change in happiness in the period covered by the series. Since happiness is expressed on range 0-10, a regression coefficient of 0.01 means a rise of 0.1 point per year, which amounts to a 1 point gain in happiness over 10 years. These yearly coefficients were used in the following ways.

Ratio of rise or decline

We first counted the number of series in which happiness had gone up and the number in which happiness had gone down. On that basis we assessed the ratio; a ratio greater than 1 indicates that increasing happiness is more common than decline; a ratio of 1 that rising and declining happiness are equally frequent, and a ratio smaller than one that a decline in happiness is the most common. The Easterlin Paradox predicts a ratio of 1.

Average change coefficient

The above bi-partitions provide a view on the relative frequency of rise and decline in happiness, but does so at the cost of loss of variation. In order to use the available variance more fully we computed the average change over all 199 series and assessed whether that average coefficient was positive or negative.

Significance test

A next question was whether the observed average change is worth considering or not. One way to answer that question is to consider the effect size and pick a minimum, such as a 0.1 point difference, over a 10 year period. In that case our conclusion limits to the cases studied here.

Another way to deal with this is to assess statistical significance from zero. Though routinely performed, this analysis involves making strong assumptions that do not fully apply in this case. One assumption is that the 199 series provide a random sample of all possible time series in the 67 nations. Another dubious assumption is that the 67 nations provide a random sample of all nations in the

world. If one accepts these assumptions a significance test makes sense and for the readers who do so we did that test.

3.1.2 Change of average happiness in countries

Using the change coefficients in the series, we computed the average change coefficients for each of the 67 nations. Where only one series was available, we took the change coefficient observed in that one and when more series were available we computed the average change score.

These change scores in nations were analyzed in the same way as the change scores in the series. First a ratio of rise or decline in happiness was obtained and then the average change scores were computed and we assessed the statistical significance of these scores.

3.2 Assessing economic growth

We assessed the average yearly growth of GDP per capita for each of the countries, for each of the periods for which a series on average happiness was available. These change coefficients ranged from -0.034 in Belarus 1990-2000 to +0.120 in China 2000-2009. With three exceptions the coefficients were positive.

3.3 Assessing correspondence between growth of GDP and happiness

Different questions are at stake here: research question 2a deals with whether economic growth tends to go with *any* change in happiness. Next question 2b deals with whether *more* economic growth is followed by a *greater* rise in happiness. Question 3 deals with the possible variations on these general patterns of correlation.

3.3.1 Is there any correlation?

Question 2a deals with whether there is any correspondence between economic growth and rising happiness in nations and serves as a first test of Easterlin's claim that economic growth does not buy greater happiness. To check this hypothesis we counted the number of cases in which this thesis applied and compared it with the number of cases in which it did not.

To that end we first ordered the possible combinations of growth and decline, see the 2x2 table presented in scheme 1. The 'paradoxical' cases are called 'dissonant' and colored red. The cases that fit common sense are called 'consonant' and colored green. We next counted the number of cases in each category and assessed the Odds Ratio. If Easterlin is right that ratio must be about 1.

Scheme 1a about here

3.3.2 More cases of rising happiness in strong growing economies?

Question 2b deals with whether happiness has risen more in countries where the economy has grown the most. One answer to this question is whether rising

happiness is more common in the fastest growing economies. A related, but not identical, question is whether the rise of happiness is proportionally greater in the fast growing economies.

Odds of rise or decline of happiness in slow and fast economic growth
We distinguished between cases of modest economic growth and strong economic growth, using the median of the growth percentages found.

Scheme 1b about here

Correlation between change scores of happiness and GDP
Next we assessed the correlation between the *rates* of yearly change in GDP and happiness. We did this for all of the 199 time series for happiness and then computed the average correlation over all the time series. We then considered the average change coefficients per nation and regressed the average change in happiness against the growth of GDP in that nation in the same period, again with a one-year interval.

Estimates of effect size
In a first analysis we considered the average effect of a 1% change in GDP on happiness on a range 0-10. Then we computed the average effect of a $100 rise in GDP per capita on happiness.

3.3.3 Correspondence contingent to situations?

Question 3 deals with possible variations on this general pattern. Question 3a covers whether the effect of economic growth on happiness is short lived or rather manifests in the long term. Question 3b deals with whether the effect differs across poor and rich nations and question 3c with whether smooth economic growth works out better on average happiness than bumpy growth.

Short and long-term
To answer question *3, w*e repeated the above mentioned analyses for each of the three time intervals considered, the short term of 10 to 20 years, the medium term of 21 to 40 years and the long-term of more than 40 years.

Poor and rich nations
To answer question 3b we measured economic prosperity of nations using the GDP per capita in US $. The data used for this analysis were again taken from the website of the World Bank (2012). We followed the distinction made by the World Bank between: ‘low’ income’ ‘lower-middle’ income, ‘upper-middle’ income and ‘high income nations. Our data set did not include any ‘low-income’ countries, as rated by the World Bank.

Smooth versus bumpy growth

To answer question 3c we estimated instability (i) in economic growth by taking the variance in yearly GDP per capita that cannot be explained by the linear trend over the years. To that end we first regressed GDP on year, with GDP dependent and year independent. In the case of perfect stability all GDP scores should be on the trend line, and the regression coefficient 1. We computed the deviation from that pattern, using the following formula: $i = R^2 - 1$.

3.3.4 Robust across measures of happiness?

Finally we checked whether these patterns differed across the measures of happiness used in these time series.

4 RESULTS

Our findings contradict Easterlin's predictions: average happiness has increased in most nations and increased more in the nations where the economy had grown. This pattern was found over long time spans and appeared both among poor and rich nations nations.

4.1 Happiness rose in most nations

Question 1 dealt with whether average happiness in nations tends to remain at the same level over the years (as Easterlin holds), or that average happiness tends to rise (as Hagerty and Veenhoven hold).

4.1.1 More advance than decline

Ratio of rise and decline

Of the 199 series 66% showed a rise in happiness and 34% a decline, which resulted in a ratio of 1.9. Likewise happiness rose in 64% of the 67 nations and declined in 36%, which is a ratio of 1.6. See table 1a. This is clearly more than the ratio of about 1 that Easterlin predicts.

Table 1a about here

Average change coefficients

The average yearly rise in happiness observed in the 199 series is +.0.016. The average rise in the 67 nations was +0.012.

These numbers may seem small at first sight, but result in a considerable improvement in happiness in the long term. At this growth rate average happiness will rise one point on a 0-10 scale in 70 years. Given that the actual range on this scale is between 2.5 and 8.5 (Veenhoven 2012d), a one point rise equals a gain of 17%.

4.1.2 In the long run

In his latest paper Easterlin argues that happiness rises in the short run only. Our data show otherwise. We can see from table 1b that the average change in happiness does not differ very much between the short and the long term and that the rise is slightly stronger in the long term.

Table1b about here

4.2 Rise of happiness paralleled by economic growth

Now that we have established that average happiness has risen in most nations, the next questions are about the relationship of this rise with economic growth. Question 2a deals with whether there any parallel at all between increase of average happiness and GDP. If so, question 2b is whether there is proportionality in the

relationship: Has happiness increased *more* in the nations were the economy has grown the *most*? Lastly question 3 is whether we are dealing with a general pattern or whether the correlation between rising happiness and growth of the economy is contingent on specific situations.

4.2.1 More consonant than paradoxical combinations

Question 2a covers whether economic growth tends to be accompanied by rising happiness. According to Easterlin this is typically not the case and the term 'paradox' is used to denote this difference between this common sense expectation and reality. What is the most common pattern in the period observed here? Following the method presented in section 3.1.1 we counted the number of cases in which economic growth was paralleled by rising happiness (consonant with common sense) and the number of cases in which it was not (paradox) and next assessed the ratio of these.

Ratio of rise versus decline

As a first step we sorted the 199 cases in a double dichotomy. See table 2a. As one can see, there are hardly any cases of economic decline. Most of the variation is in changes of average happiness. In this table the number of consonant cases is 133 and the number of paradoxical cases 67, which equals a ratio of 2.0. So 'paradoxical' combinations are clearly not the rule.

Table 2a about here

4.2.2 Greater rise of happiness in nations where the economy grew most

Question 2b, in extension to question 2a, deals with proportionality in the relationship between increase of happiness and economic growth: has more economic growth come together with a greater rise in happiness? This correlation was assessed in two ways.

More rise of happiness in fastest growing countries

We distinguished between slow and fast growing economies, using the median of economic growth in our dataset. We next counted the cases of rising and declining happiness in each of these categories, see table 2b. Again we compared the number of cases that fit the common sense expectation that more growth goes with more happiness to the paradoxical situation. Once more the former outweighed the latter. The Odds Ratio was 2.25 and statistically significant.

Table 2b about here

Significant correlation

Considering the correlation between average economic growth in the past year and average change of happiness we observed a correlation of +0.22. This correlation is significantly different from zero at the 95% confidence level. A split-up of the data by length of the time period considered showed similar correlations, see table 2c. So

the Easterlin Paradox fails this test.

The pattern of correlation is presented visually in the scatter plots shown in figures 1a, 1b and 1c. In each of these figures one can see a modest correlation. There is no clear pattern of non-linearity.

Table 2c about here
Figures 1a-c about here

Size of the effect
Statistical significance is not the same as a substantial effect size. The average effect of 1% economic growth on happiness in the next year is a gain of about 0.00335 points on a scale of 0-10.. Whether this effect is strong of small will be discussed in section 5.2.

4.3 Variation across situations

Question 3 deals with possible contingencies. Are we dealing with a general pattern or does economic growth add to happiness only in specific conditions?

Not only in the short run
The available data show a positive effect of economic growth on happiness in the (many) cases of 'short' 10 to 20 year periods and theseover 10 to 40 years. The correlation of the yearly change rates is +.0.015 in both cases. The correlation is smaller in the 18 long-term cases considered here (+0,007), but still positive. See Table 3a. It is as yet unclear whether this difference is in the nations (all developed) or in the time-span.

Table 3a about here

Stronger in poor nations
In line with expectation we found that the correlation between happiness and economic growth is strongest in the poor nations. The correlation is quite strong in the 'lower middle' income nations in this data set and almost zero in the nations where the income per capita is at the upper middle level and the high level. See Table 3b.

Table 3b about here

No less in bumpy growth
We expected that the effect of economic growth on happiness would be smaller in nations that have gone though economic ups and downs than in nations where the economy has grown more smoothly. This expectation was not supported by the data, see table 3c.

Table 3c about here

4.4 *Similar across measures of happiness*

Finally we checked whether the correlations between happiness and economic growth differ across the measures of happiness used. To that end we limited our examination to cases for which at least 15 time-series were available, since the variation in the nations involved might otherwise cloud the effect of the measures. There were 4 such cases in the data set, all of which yielded yearly change correlations in the range of +.0025 to +0.034, results not shown.

5 DISCUSSION

Our aim with this study was to check the truth of the Easterlin paradox. We tested the claim that average happiness in nations tends to remain at the same level in spite of economic growth. Our data do not support that claim; we found that happiness tends to rise over time and to rise more in nations where the economy has grown the most.

This begs the question of why our findings differ from Easterlin's. The next question we must ask is about the observed effect size: Is this small or substantial? We conclude that the long-term effect of economic growth on happiness is substantial and this opens a new agenda for research. The demise of the Easterlin paradox will also require an ideological reorientation for many of those who believed in it.

5.1 Why ar our results different from Easterlin's latest reading of the data?

Easterlin's latest analysis (2011) is based on data for 37 nations over time spans varying from 12 to 34 years. The number of data points used is not reported. The analysis reported in this paper draws on data from 67 nations and over periods running from a minimum of 10 years to 46 years, which gave us 1531 data points. This difference in size of the available data pool is crucial. The law of greater numbers helped us to see a general pattern, which Easterlin could not see.

Additionally, Easterlin uses responses to a question on financial satisfaction as the dependent variable in his separate analysis of 17 Latin American nations. Yet, financial satisfaction is not the same as life-satisfaction and is more likely to adjust to changed income levels as has been shown by Kapteyn et. al (1978). We consistently used the available data on happiness in the sense of life-satisfaction and in this respect our data are better suited to the question to hand.

5.2 Is the effect of economic growth on happiness big or small?

As we have seen, 1% economic growth was followed by a rise in average happiness in the next year of 0,00335. This yearly gain in average happiness may appear small at first sight and could as such be taken as a proof of the thesis that happiness changes little over time. Yet economic growth is typically higher than 1% a year and small effects amount to a considerable increase in the long term. An annual 5% growth of the economy will lead to a gain of a full point in average happiness on a scale 0-10 in 60 years, which equals 10% of the theoretical variation on a scale of 0-10 and 17% of the actual variation between 2.5 and 8.5.

When expressed in effect of a $100 increase in GDP per capita the average effect of economic growth on happiness is about 0.10 in poor countries and 0.003 in rich countries (table 3b) This means that in poor nations a gain of one point of happiness on scale 0-10 will require a $1000 increase and in rich countries an increase of about $ 33.000.

The above figures are probably an underestimation of the real effects of economic growth on happiness. One reason is that the law of big numbers may not have neutralized all the random measurement error in both the measures of happiness and economic growth, which will have attenuated the change coefficients. Another reason is that our perspective on the real effect of economic growth is still blurred by external shocks such as the regime changes in the East European nations after the fall of communism and the civil wars in Africa.

Seen in this perspective, the rise of happiness is comparable to the extension of longevity in modern society, where a long process of piecemeal increments has resulted in a doubling of our life time.

In the long-term perspective it is also clear that the rise of happiness is unlikely to continue forever, since an average happiness of about 8.5 is probably the maximum possible in a country. So there will be a point where economic growth no longer adds to greater happiness. Yet economic development is also likely to contribute to longevity, which seems to be less bound to a maximum. If so, economic growth will still result in a rising number of happy life years for individuals (Veenhoven 2005).

5.3 New research questions

The question raised by the Easterlin Paradox is why does economic growth *not* result in greater happiness. Now we have seen that economic growth typically *does* add to average happiness in nations, the questions to ask are: *how* does economic growth add to happiness and *why* does it not always do so? To answer these questions we can build on the earlier research instigated by the Easterlin paradox, such as on negative effects of economic growth and adaptation processes, but take these as elements in wider a balance of effects.

In exploring how economic growth adds to happiness a crucial question is to determine to what extent the effect is due to increased consumption and to what extent it is due to institutional changes that tend to go together with economic development, such as political democracy and women's emancipation. The recent study of Diener et al. (2012) suggests that a great deal of the effect of economic growth on happiness can be found in material comfort, but this is certainly not the last word.

5.4 Ideological implication

The appeal of Easterlin Paradox roots both in ideological unease about the market economy and concern for sustainability. Now that it can no longer be denied that economic growth adds to human happiness, advocates of these views should be prepared to sacrifice some happiness for the sake of these ideals. Though valuable for many reasons, happiness is not everything. There is nothing wrong with such a choice, but it will be difficult to sell.

6 CONCLUSION

Economic growth in nations *does* tend to go with rising happiness. Though there are cases where happiness remains stable in spite of economic growth, these are exceptions rather than the rule. The ‘Easterlin Paradox’ has become the ‘Easterlin Illusion’.

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Scheme 1a

Combinations of change in happiness and change in GDP per capita

Rise or decline in GDP

Change happiness	***Change GDP***	
	growth	*decline*
increase	**consistent**	**paradox**
decline	**paradox**	**consistent**

Scheme 1b

Combinations of change in happiness and change in GDP per capita

Great or small rise in GDP

Change happiness	***Growth GDP***	
	great	*small*
increase	**consistent**	**consistent**
decline	**paradox**	**paradox**

Consistent = in line with common sense

Paradox = contrary to common sense (Easterlin thesis)

Table1a
Change of average happiness in nations
Frequency of rise versus decline

Pattern of change	***series***		***nations***	
	N	*%*	*N*	*%*
Rise	133	66%	41	62%
Decline	66	34%	25	38%
Total	199	100%	67	100%
Ratio rise-decline	**1.94**		**1.64**	

Table 1b

Change of average happiness in nations

Average yearly change in points on scale 0-10, split-up by length of period

Period	***series***		***nations***	
	N	*b*	*N*	*b*
Short-term	114	+0.017	30.5	+0.010
Medium term	67	+0.013	27.0	+0.009
Long- term	18	+0.020	8.5	+0.030
Total	**199**	**+0.016**	**67**	**+0.012**

Table 2a

Rise or decline of happiness and GDP

Combinations of change coefficients observed in 200 series

Change happiness	***Change GDP***	
	rise	*decline*
rise	**132**	**1**
decline	**64**	**2**
Ratio	**2.2**	

Consistent Paradox Ratio: 2

Table 2b

Rise *or* decline of happiness by strong *or* modest economic growth

Combinations observed in 198[6] series

Change happiness	***Growth GDP***	
	strong growth > median	*modest growth < median*
rise	**74**	**59**
decline	**24**	**41**

OR = 2.27 CI95 [1.24 – 4.18]. p<0.006 in one sided test

Table 2c

Correlation between change in average happiness and growth GDP

in 197 time series

Time span	**Correlation ▲ Happiness with ▲ GDP**	**95% confidence interval of r**
10-20 years	+0.20	+0.01 to +0.37
21-40 years	+0.21	+0.05 to +0.50
> 40 years	+0.20	-0.03 to +0.61
All periods	+0.20	+0.08 to +0.34

[6] Case of median economic growth not included

Table 3a

Average effect of 1% growth GDP p.c. on average happiness on scale 0-10

Split-up by time span

Time span	***series***	
	N	*b*
10-20 years	114	0,0030
21-40 years	67	0,0063
> 40 years	18	0,0048
All	**199**	**0,0034**

Table 3b

Average effect of 1% growth GDP p.c. on average happiness on scale 0-10

Split-up by initial wealth of the nation

Average income per capita in nation	***series***	
	N	*b*
Low	0	-
Lower middle	20	0,0117
Upper middle	56	0,0034
High	123	0,0029
Total	**199**	0,0034

Table 3c

Average effect of 1% growth GDP p.c. on average happiness on scale 0-10

Split-up by instability of economic growth on a 0-1 scale

Economic development	***series***	
	N	*b*
Smooth: i < 0,1	57	0,0054
Medium: 0,1 < i < 0,25	80	0,0032
Bumpy: i > 0,25	62	0,0061
Total	**199**	0,0034

Figure 1a

Economic growth and rising happiness in nations

Correlation in 114 series over 10 to 20 year periods

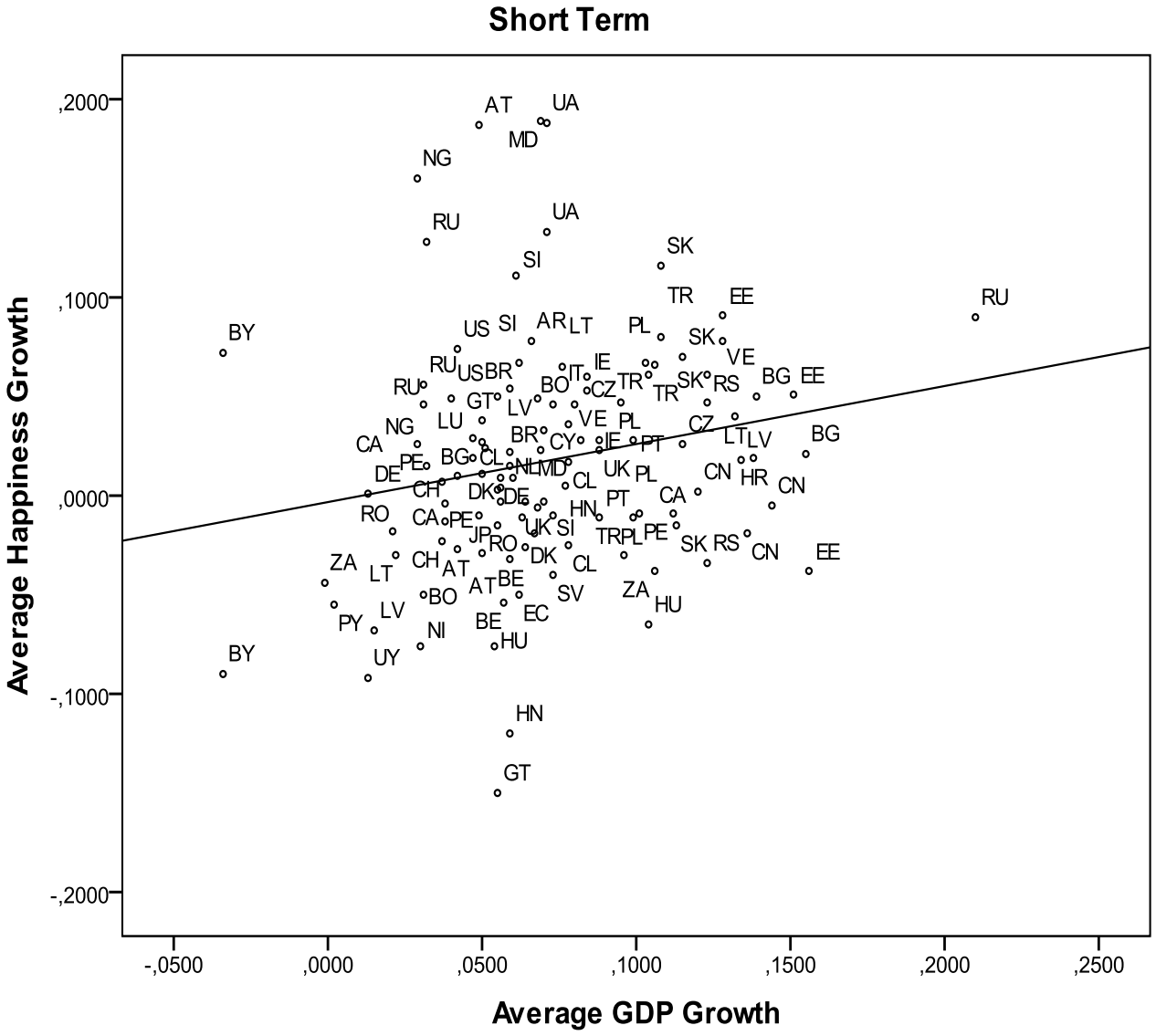


Figure 1b

Economic growth and rising happiness in nations

Correlation in 67 series over 21 t0 40 year period

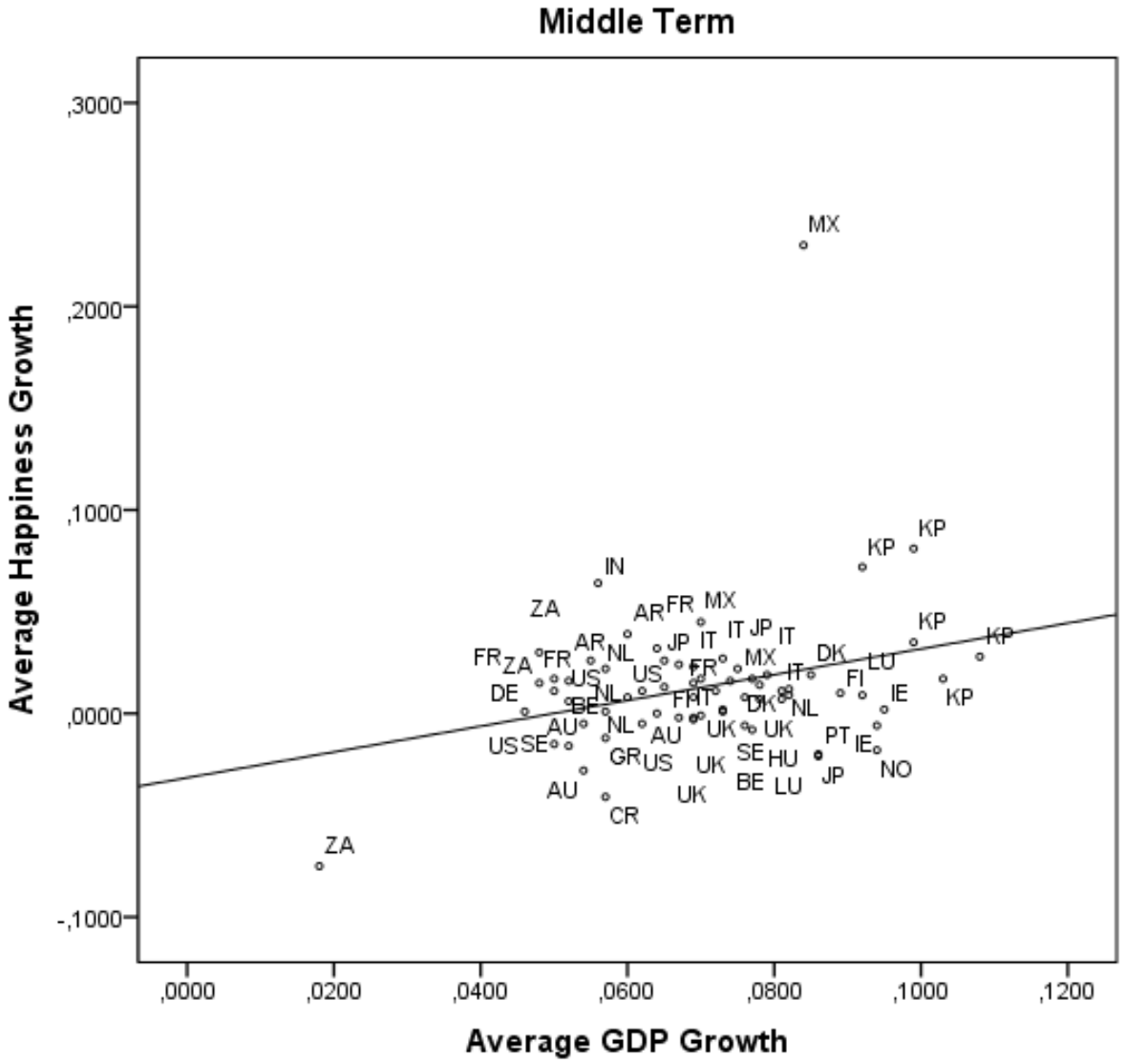
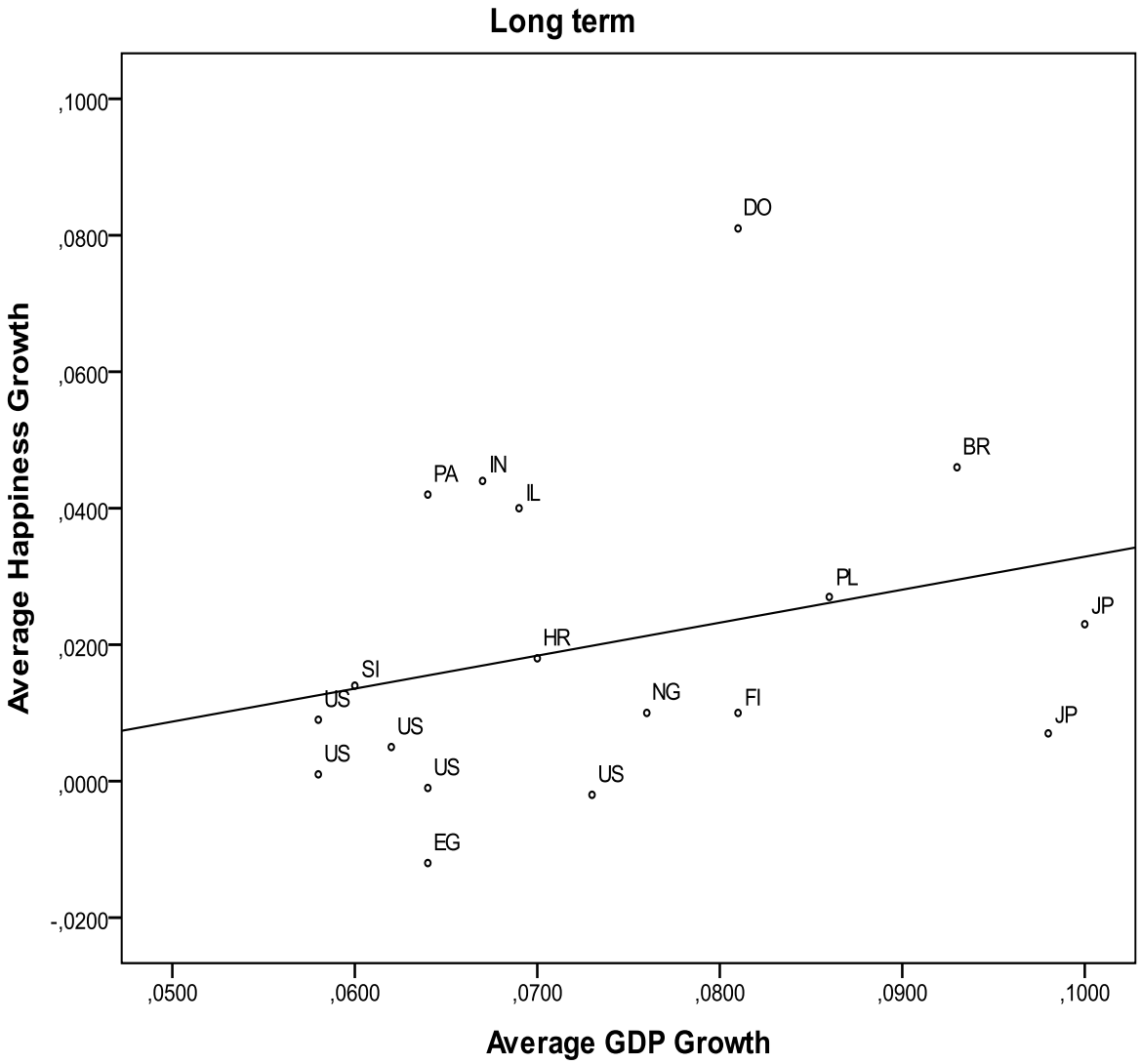


Figure 1c

Economic growth and rising happiness in nations

Correlation in 18 series over periods of more than 40 years



Appendix A
Example of a presentation of findings on average happiness in nations
in the collection 'Happiness in Nations' of the 'World Database of Happiness'

Distributional findings on happines in Argentina (AR)

Measure type: 111C 4-step verbal Happiness

Taking all things together, would you say you are?:
- very happy
- quite happy
- not very happy
- not at all happy

very = 4 .....not at all = 1

Details	Measure code	Year	On original range 1 - 4		On range 0 - 10	
			Mean	SD	Mean	SD
	O-HL-u-sq-v-4-a	1981	2.95	0.65	6.80	1.88
	O-HL-u-sq-v-4-a	1991	3.07	0.82	7.00	2.27
	O-HL-u-sq-v-4-a	1995	3.09	0.73	7.13	2.01
	O-HL-u-sq-v-4-a	1999	3.13	0.75	7.20	2.08
	O-HL-g-sq-v-4-f	2002	2.60	0.92	5.11	2.64
	O-HL-u-sq-v-4-a	2005	3.20	0.67	7.45	1.78
	O-HL-g-sq-v-4-f	2008	3.03	0.72	6.37	2.03
Average			3.01	0.75	6.72	2.10

Measure type: 121C 4-step verbal LifeSatisfaction

How satisfied are you with the life you lead?
- very satisfied
- fairly satisfied
- not very satisfied
- not at all satisfied

very = 4 ..... not at all = 1

Details	Measure code	Year	On original range	On range

			1 - 4		0 - 10	
			Mean	SD	Mean	SD
	O-SLu-g-sq-v-4-b	1997	2.14	0.96	6.41	2.01
	O-SLu-g-sq-v-4-b	2000	2.21	1.01	6.52	2.02
	O-SLu-g-sq-v-4-c	2001	2.81	0.86	5.99	2.34
	O-SLu-g-sq-v-4-c	2003	2.91	0.77	6.27	2.13
	O-SLu-g-sq-v-4-c	2004	2.92	0.83	6.30	2.29
	O-SLu-g-sq-v-4-c	2005	2.92	0.84	6.30	2.31
	O-SLu-g-sq-v-4-c	2006	3.02	0.74	6.57	2.05
	O-SLu-g-sq-v-4-c	2007	2.85	0.75	6.11	2.04
	O-SLu-g-sq-v-4-dc	2008	3.01	0.77	6.82	2.00
	O-SLu-g-sq-v-4-c	2010				
	O-SLu-g-sq-v-4-da	2010	2.94	0.89	6.64	2.31
Average			2.77	0.84	6.39	2.15

Measure type: 122F 10-step numeral LifeSatisfaction

All things considered, how satisfied are you with your life as-a-whole now?
10 satisfied
.
. .
1 dissatisfied

Details	Measure code	Year	On original range 1 - 10		On range 0 - 10	
			Mean	SD	Mean	SD

	O-SLW-c-sq-n-10-aa	1981	6.80	2.10	6.44	2.34
	O-SLW-c-sq-n-10-aa	1990	7.25	2.03	6.95	2.25
	O-SLW-c-sq-n-10-aa	1995	6.92	2.32	6.58	2.58
	O-SLW-c-sq-n-10-a	1999	7.33	2.26	7.03	2.51
	O-SLW-c-sq-n-10-a	2006	7.79	1.91	7.54	2.12
Average			7.22	2.12	6.91	2.36

Measure type: 122G 11-step numeral LifeSatisfaction

All things considered, how satisfied or dissatisfied are you with your life as-a-whole these days?
10 very satisfied
.
.
0 not satisfied

Details	Measure code	Year	On original range 0 - 10		On range 0 - 10	
			Mean	SD	Mean	SD
	O-SLW-c-sq-n-11-a	2007	7.14	1.82	7.14	1.82
Average			7.14	1.82	7.14	1.82

Measure type: 222 10-item Affect Balance Scale (Bradburn)

During the past few weeks did you ever feel (yes/no)
- particularly excited or interested in something?
- so restless that you couldn't sit long in a chair?
- proud because someone complimented you on something you had done?
- very lonely or remote from other people?
- pleased about having accomplished something?
- bored?
- on top of the world?
- depressed?
- that things were going your way?
- upset because someone criticized you?

Details	Measure code	Year	On original range -5 - 5		On range 0 - 10	
			Mean	SD	Mean	SD
	A-BB-cm-mq-v-2-a	1991	1.26	1.93	6.26	1.93
Average			1.26	1.93	6.26	1.93

Measure type: 235 More days like yesterday

Do you want more days like yesterday?
- yes
- no
% yes

Details	Measure code	Year	On original range 0 - 100		On range 0 - 10	
			Mean	SD	Mean	SD
	A-AOL-yd-sq-v-2-a	2008	76.00			
Average			76.00			

Measure type: 236 14-item Yesterday's Affect Balance

Did you feel yesterday.. (yes/no)?
- well rested
- worried
- proud
- depressed
- ...etc
Computation: % positive affect minus % negative affect

Details	Measure code	Year	On original range -100 - 100		On range 0 - 10	
			Mean	SD	Mean	SD
	A-AB-yd-mq-v-2-b	2008	47.00			
Average			47.00			

Measure type: 31D 11-step numeral Best-Worst possible Life

Suppose the top of the ladder represents the best possible life for you and the bottom of the ladder the worst possible life. Where on this ladder do you feel you personally stand at the present time?
- 10
- .
- .
- 0

Details	Measure code	Year	On original range 0 - 10		On range 0 - 10	
			Mean	SD	Mean	SD
	C-BW-c-sq-l-11-c	2002	5.99	2.40	5.99	2.40
	C-BW-c-sq-l-11-c	2006	6.27	2.01	6.27	2.01
	C-BW-c-sq-l-11-c	2007	6.69	1.87	6.69	1.87
	C-BW-c-sq-l-11-c	2008	6.20	1.80	6.20	1.80
	C-BW-c-sq-l-11-c	2008	6.00		6.00	
	C-BW-c-sq-l-11-c	2010	6.30	1.80	6.30	1.80
	C-BW-c-sq-l-11-c	2011	6.80		6.80	
Average			6.32	1.97	6.32	1.97

Measure type: 411B 3-step Feel Happy

Do you feel...?
- happy
- fairly happy
- unhappy

Details	Measure code	Year	On original range 1 - 3		On range 0 - 10	
			Mean	SD	Mean	SD
	M-FH-u-sq-v-3-k	2011	2.61	0.60	6.23	1.22

Average	2.61	0.60	6.23	1.22

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Appendix B
Data matrix

Period	Country	OHL3	OHL4	OHL5	OSL2	OSL3	OSL4	OSL5	OSL7	OSL10	OSL11	CBW	Happ/GDP	GDP-growth	Term	Development	Instability
1981-2005	Argentina		0,026										0,003	0,055	Middle	Upper mid.	0,687
1981-2006	Argentina									0,039			0,001	0,060	Middle	Upper mid.	0,733
2002-2011	Argentina											0,078	0,006	0,066	Short	Upper mid.	0,491
1981-2005	Australia		-0,005										-0,001	0,054	Middle	High	0,178
1981-2005	Australia										-0,001		-0,003	0,054	Middle	High	0,178
1975-2008	Australia											0,011	0	0,070	Middle	High	0,150
1975-2011	Australia												0,001	0,072	Middle	High	0,185
1990-2006	Austria		-0,029										-0,002	0,050	Short	High	0,428
1995-2011	Austria						-0,027						-0,001	0,042	Short	High	0,289
1990-1999	Austria									0,187			0,018	0,049	Short	High	0,314
1990-2000	Belarus		0,072										-0,559	-0,034	Short	Upper mid.	0,243
1990-2000	Belarus									-0,09			-0,317	-0,034	Short	Upper mid.	0,243
1975-1986	Belgium	-0,054											-0,004	0,057	Short	High	0,833
1981-2006	Belgium		0,016										0,002	0,052	Middle	High	0,154
1973-2011	Belgium						-0,008						0	0,077	Middle	High	0,098
1981-1999	Belgium									0,011			0,001	0,050	Short	High	0,133
1989-2008	Belgium										-0,032		-0,002	0,059	Short	High	0,270
1997-2007	Bolivia						-0,05						0,055	0,031	Short	Lower mid.	0,912
2002-2011	Bolivia											0,046	0,036	0,073	Short	Lower mid.	0,116
1990-2006	Brasil		0,054										0,024	0,059	Short	Upper mid.	0,920
1990-2006	Brasil									0,022			0,001	0,059	Short	Upper mid.	0,920
1960-2011	Brasil											0,046	0,009	0,093	Long	Upper mid.	0,249
1990-2006	Bulgaria		0,029										-0,008	0,047	Short	Upper mid.	0,734
2001-2011	Bulgaria						0,05						0,009	0,139	Short	Upper mid.	0,053
1990-2006	Bulgaria									0,019			0,014	0,047	Short	Upper mid.	0,734
2002-2011	Bulgaria											0,021	0,004	0,155	Short	Upper mid.	0,055

Period	Country	OHL3	OHL4	OHL5	OSL2	OSL3	OSL4	OSL5	OSL7	OSL10	OSL11	CBW	Happ/GDP	GDP-growth	Term	Development	Instability
1990-2006	Estonia		0,051										0,008	0,151	Short	High	0,162
2001-2011	Estonia						0,091						0,006	0,128	Short	High	0,153
1990-1999	Estonia									-0,038			0,071	0,156	Short	High	0,036
1972-2006	Finland		0,01										0,001	0,089	Middle	High	0,104
1956-2011	Finland						0,01						0,002	0,081	Long	High	0,103
1981-2005	Finland									0			0	0,064	Middle	High	0,247
1975-1986	France	-0,003											0	0,064	Short	High	0,546
1981-2006	France		0,017										0,002	0,050	Middle	High	0,167
1973-2011	France						0,016						0,002	0,074	Middle	High	0,083
1981-2006	France									0,011			0,001	0,050	Middle	High	0,167
1975-2011	France											0,032	0,003	0,064	Middle	High	0,092
1991-2009	Germany	0,009											0,001	0,056	Short	High	0,447
1997-2006	Germany		0,001										0	0,013	Short	High	0,814
1990-2010	Germany						0,001						0,001	0,046	Middle	High	0,340
1981-2011	Greece						-0,012						-0,002	0,057	Middle	High	0,151
1997-2009	Guatamala						0,05						0,054	0,055	Short	Lower mid.	0,238
2002-2011	Guatamala											-0,15	-0,104	0,055	Short	Lower mid.	0,044
1997-2007	Honduras						0,005						0,004	0,077	Short	Lower mid.	0,037
2002-2011	Honduras											-0,12	-0,106	0,059	Short	Lower mid.	0,042
1981-2006	Hungary		-0,006										-0,002	0,076	Middle	High	0,234
2001-2011	Hungary						-0,065						-0,007	0,104	Short	High	0,138
1981-1999	Hungary									-0,076			-0,048	0,054	Short	High	0,074
1981-1999	Iceland	0,004											0,001	0,056	Short	High	0,192
1981-1999	Iceland									-0,003			0	0,056	Short	High	0,192
1990-2006	India		0,027										0,072	0,050	Short	Lower mid.	0,226
1975-2007	India										0,064		0,315	0,056	Middle	Lower mid.	0,184
1962-2011	India											0,044	0,087	0,067	Long	Lower mid.	0,272
1975-1986	Ireland	0,06											0,016	0,084	Short	High	0,216
1981-2006	Ireland		-0,006										0	0,094	Middle	High	0,130

Period	Country	OHL3	OHL4	OHL5	OSL2	OSL3	OSL4	OSL5	OSL7	OSL10	OSL11	CBW	Happ/GDP	GDP-growth	Term	Development	Instability
1973-2011	Ireland						0,002						0	0,095	Middle	High	0,153
1981-1999	Ireland									0,028			0,003	0,088	Short	High	0,069
1961-2011	Israel											0,04	0,008	0,069	Long	High	0,085
1975-1986	Italy	0,053											0,011	0,084	Short	High	0,188
1981-2006	Italy		0,024										0,003	0,067	Middle	High	0,156
1973-2011	Italy						0,019						0,002	0,079	Middle	High	0,071
1981-2005	Italy									0,008			0,001	0,069	Middle	High	0,175
1975-2009	Italy										0,011		0,001	0,081	Middle	High	0,088
1975-2011	Italy											0,027	0,003	0,073	Middle	High	0,075
1981-2005	Japan		0,026										0,002	0,065	Middle	High	0,241
1964-2011	Japan						0,007						0,001	0,098	Long	High	0,099
1978-2002	Japan							-0,021					-0,001	0,086	Middle	High	0,136
1988-2005	Japan							-0,01					-0,001	0,049	Short	High	0,623
1981-2005	Japan									0,013			0,001	0,065	Middle	High	0,241
1975-2007	Japan										0,022		0,002	0,075	Middle	High	0,159
1962-2011	Japan											0,023	0,002	0,100	Long	High	0,099
1981-2005	Korea		0,081										0,014	0,099	Middle	High	0,093
1981-2001	Korea								0,017				0,003	0,103	Middle	High	0,130
1981-2005	Korea									0,035			0,006	0,099	Middle	High	0,093
1980-2007	Korea										0,028		0,004	0,108	Middle	High	0,096
1981-2011	Korea											0,072	0,009	0,092	Middle	High	0,080
1990-2006	Latvia		0,049										0,011	0,068	Short	Upper mid.	0,383
2001-2011	Latvia						0,018						0,001	0,134	Short	Upper mid.	0,193
1990-1999	Latvia									-0,068			0,1	0,015	Short	Upper mid.	0,975
1990-2006	Lithuania		0,065										0,011	0,076	Short	Upper mid.	0,338
2001-2011	Lithuania						0,04						0,004	0,132	Short	Upper mid.	0,135
1990-1999	Lithuania									-0,03			0,113	0,022	Short	Upper mid.	0,968
1975-1986	Luxembourg	0,038											0,008	0,050	Short	High	0,707
1973-2011	Luxembourg						0,009						0	0,092	Middle	High	0,145

Period	Country	OHL3	OHL4	OHL5	OSL2	OSL3	OSL4	OSL5	OSL7	OSL10	OSL11	CBW	Happ/GDP	GDP-growth	Term	Development	Instability
1975-2004	Luxembourg										0,009		0,001	0,082	Middle	High	0,092
2001-2011	Malta						-0,011						-0,001	0,063	Short	High	0,062
1981-2005	Mexico		0,045										0,032	0,070	Middle	Upper mid.	0,248
1981-2005	Mexico									0,017			0,016	0,070	Middle	Upper mid.	0,248
1975-2007	Mexico										0,23		0,01	0,084	Middle	Upper mid.	0,176
1975-2011	Mexico											0,017	0,009	0,077	Middle	Upper mid.	0,146
1996-2006	Moldavia		0,023										-0,008	0,069	Short	Lower mid.	0,649
1996-2006	Moldavia									0,189			0,25	0,069	Short	Lower mid.	0,649
1975-1986	Netherlands	0,015											0,008	0,059	Short	High	0,712
1981-2008	Netherlands		0,022										0,002	0,057	Middle	High	0,114
1977-2011	Netherlands			-0,005									0	0,062	Middle	High	0,113
1973-2011	Netherlands						0,007						0,001	0,078	Middle	High	0,103
1974-2009	Netherlands							0,012					0,001	0,082	Middle	High	0,121
1981-2008	Netherlands									0,001			0	0,057	Middle	High	0,114
1997-2007	Nicaragua						-0,076						-0,207	0,030	Short	Lower mid.	0,149
1990-2000	Nigeria		0,16										1,198	0,029	Short	Lower mid.	0,953
1990-2000	Nigeria									0,026			0,438	0,029	Short	Lower mid.	0,953
1962-2011	Nigeria											0,01	0,012	0,076	Long	Lower mid.	0,597
1972-2007	Norway		-0,018										-0,001	0,094	Middle	High	0,109
1981-1996	Norway									-0,019			-0,001	0,067	Short	High	0,095
1962-2011	Panama											0,042	0,032	0,064	Long	Upper mid.	0,112
1997-2007	Paraguay						-0,055						-0,082	0,002	Short	Lower mid.	0,672
1996-2005	Peru		0,015										0,002	0,032	Short	Upper mid.	0,995
1997-2007	Peru						-0,013						-0,007	0,038	Short	Upper mid.	0,589
2002-2011	Peru											-0,009	0	0,101	Short	Upper mid.	0,045
1991-2000	Poland	0,028											0,01	0,082	Short	High	0,050
1990-2007	Poland		-0,011										-0,005	0,099	Short	High	0,096
2001-2011	Poland						0,066						0,031	0,106	Short	High	0,108
1990-2007	Poland									0,028			0,08	0,099	Short	High	0,096

Period	Country	OHL3	OHL4	OHL5	OSL2	OSL3	OSL4	OSL5	OSL7	OSL10	OSL11	CBW	Happ/GDP	GDP-growth	Term	Development	Instability
1962-2011	Poland											0,027	0,007	0,086	Long	High	0,173
1990-2006	Portugal		0,036										0,005	0,078	Short	High	0,169
1985-2011	Portugal						-0,02						-0,002	0,086	Middle	High	0,062
1990-1999	Portugal									-0,011			-0,002	0,088	Short	High	0,166
1990-2006	Romania		-0,003										0,009	0,070	Short	Upper mid.	0,467
1990-2003	Romania							-0,018					-0,003	0,021	Short	Upper mid.	0,692
1990-2005	Romania									-0,015			0,031	0,055	Short	Upper mid.	0,500
1990-2005	Russia		0,046										0,037	0,031	Short	Upper mid.	0,892
1992-2005	Russia							0,128					-0,001	0,032	Short	Upper mid.	0,981
1990-2005	Russia									0,056			0,073	0,031	Short	Upper mid.	0,892
2002-2011	Russia											0,09	0,01	0,210	Short	Upper mid.	0,115
1996-2006	Serbia						-0,034						-0,018	0,123	Short	Upper mid.	0,834
1996-2006	Serbia						0,047						0,017	0,123	Short	Upper mid.	0,834
1990-2006	Slovakia		0,07										0,011	0,115	Short	High	0,129
2001-2011	Slovakia						0,116						0,008	0,108	Short	High	0,074
1990-1999	Slovakia									-0,015			-0,004	0,113	Short	High	0,040
2002-2011	Slovakia											0,061	0,005	0,123	Short	High	0,090
1992-2006	Slovenia		0,111										0,013	0,061	Short	High	0,228
2001-2011	Slovenia						-0,01						0	0,073	Short	High	0,104
1990-2007	Slovenia									0,067			0,006	0,062	Short	High	0,197
1962-2011	Slovenia											0,014	0,003	0,060	Long	High	0,154
1981-2007	South-Africa		0,03										0,015	0,048	Middle	Upper mid.	0,655
1983-2002	South-Africa			-0,044									0,059	-0,001	Short	Upper mid.	0,850
1983-2004	South-Africa							-0,075					0	0,018	Middle	Upper mid.	0,924
1981-2007	South-Africa									0,015			0,041	0,048	Middle	Upper mid.	0,655
2002-2011	South-Africa											-0,038	-0,006	0,106	Short	Upper mid.	0,114
1981-2007	Spain		0,015										0,002	0,069	Middle	High	0,137
1985-2011	Spain						0,007						0	0,081	Middle	High	0,135
1981-2007	Spain									0,023			0,003	0,069	Middle	High	0,137

Period	Country	OHL3	OHL4	OHL5	OSL2	OSL3	OSL4	OSL5	OSL7	OSL10	OSL11	CBW	Happ/GDP	GDP-growth	Term	Development	Instability
1972-2006	Sweden		0,001										0	0,073	Middle	High	0,111
1995-2011	Sweden						0,024						0,001	0,051	Short	High	0,229
1981-2006	Sweden									-0,015			-0,001	0,050	Middle	High	0,222
1990-2007	Switzerland		0,007										0,001	0,037	Short	High	0,471
1990-2007	Switzerland									-0,023			-0,002	0,037	Short	High	0,471
1995-2006	Taiwan		-0,038										-0,01	0,034	Short	High	0,415
1995-2006	Taiwan									0,002			0	0,034	Short	High	0,415
1990-2000	Turkey		-0,03										-0,026	0,096	Short	Upper mid.	0,394
2001-2011	Turkey						0,067						0,006	0,103	Short	Upper mid.	0,111
1990-2007	Turkey									0,061			0,025	0,104	Short	Upper mid.	0,305
2002-2011	Turkey											0,08	0,009	0,108	Short	Upper mid.	0,089
1996-2006	Ukrain		0,133										0,131	0,071	Short	Lower mid.	0,644
1996-2006	Ukrain									0,188			0,159	0,071	Short	Lower mid.	0,644
1997-2007	Uruguay						-0,092						0,02	0,013	Short	Upper mid.	0,563
1946-2002	USA		-0,001										0,001	0,064	Long	High	0,045
1981-2006	USA		0,006										0	0,052	Middle	High	0,008
1957-2010	USA	0,001											0	0,058	Long	High	0,042
1946-1990	USA	-0,002											-0,007	0,073	Long	High	0,075
1975-2008	USA	0,008											0,001	0,060	Middle	High	0,011
1968-2000	USA					-0,002							0	0,067	Middle	High	0,016
1991-2008	USA						0,074						0,005	0,042	Short	High	0,986
1991-2004	USA						0,049						-0,001	0,040	Short	High	0,009
1973-2008	USA				0,011								0,001	0,062	Middle	High	0,012
1981-2006	USA									-0,016			-0,001	0,052	Middle	High	0,008
1959-2007	USA										0,005		0	0,062	Long	High	0,044
1959-2011	USA											0,009	0,001	0,058	Long	High	0,040
1997-2007	Venezuela						0,046						0,009	0,080	Short	Upper mid.	0,553
2002-2011	Venezuela											0,078	0,007	0,128	Short	Upper mid.	0,138

Missing data GDP: Egypt 1959, Croatia 1961-1989, Poland 1961-1984, USA 1945-1959, Finland 1955-1959, Estonia 1989-1994, Czech 1989, Lithuania 1989, Moldavia 1989, Serbia 1995-1996, Belarus 1989,.