

# THE '10-EXCESS' PHENOMENON

## in responses to survey questions on happiness

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### ABSTRACT

*Happiness in nations is typically measured in surveys using a single question. A common question is: 'All things considered, how satisfied or dissatisfied are you with your life as-a-whole these days on a scale from 0 to 10?'. The responses typically follow a uni-modal distribution with highest frequencies between 5 and 8. Yet in some nations, the percentage of 10 responses stands out and is higher than the percentage of 9 responses. In this paper we explore the prevalence of this '10-excess' pattern and check some possible explanations. We conclude that this 10-excess phenomenon is at least partly a matter of measurement bias. A correction for this bias increases the explanatory power.*

*Keywords: happiness, survey research, cross national, cultural bias, response tendencies*

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## 1. INTRODUCTION

Happiness has long been the subject of philosophical speculation, but it became a subject of empirical social science research in the second half of the 20<sup>th</sup> century. To date (2013) some 3500 empirical studies on happiness have been done, all of which are recorded in the Bibliography of Happiness, which is part of the World Database of Happiness (Veenhoven 2013b respectively a).

### 1.1 Research on happiness in nations

Of these 3500 empirical studies on happiness, some 600 compare nations. Landmark studies of this kind are reported by Cantril (1965), Inglehart (1977, 2000) and Diener et. al. (2010).

The findings of this strand of research are gathered in the World Database of Happiness. Each separate finding is described on a 'finding page' using a standard format and terminology. Some 5000 findings on how happy people are in nations are stored in the collection 'Happiness in Nations' (Veenhoven 2013c) and some hundreds of findings on societal co-variants of average happiness are held in the collection 'Correlational Findings' (Veenhoven 2013d, subject sections N2 to N7).

The main conclusions drawn from this research are: One, average happiness differs widely across nations (e.g. Schyns 1998). Two, these differences are systematic and link to societal characteristics such as economic affluence and quality of government (e.g. Ott 2010, Brulé & Veenhoven 2012, 2013, Senik 2011). Three, most of these differences are part of the modernity syndrome, i.e. the more developed the nation, the happier its citizens are (Frey & Stutzer 2002, Berg & Veenhoven 2013). Four, average happiness has gone up in most industrialized countries over the last 40 years and probably also in most non-industrialized nations (Veenhoven 2010). Five, inequality of happiness within nations is going down (Veenhoven 2005).

#### *Survey questions*

Survey research involves interrogation, typically using 'closed' questions. Respondents are presented with a standard question and answer by choosing one of a few response options, such as 'very happy', 'pretty happy' or 'not too happy'. Questions are presented in personal interviews, in questionnaires or via internet. This method of collecting information is vulnerable to various biases. Below we mention some of these and discuss how these may affect the measurement of happiness.

#### *Validity doubts*

Responses to survey questions may fail to measure what they are supposed to measure. In this context, Bourdieu (1994) argues that closed questions might shed light on topics that people would not otherwise consider. Likewise, Morin (1994) argues closed questions 'trap' respondents in pre-established schemes. An objection particular to survey questions on happiness is that such questions tap how happy respondents feel they should be given their situation, rather than how happy they actually are.

These qualms have given rise to many validity tests, see the 31 publications listed in section Ca01 of the Bibliography of Happiness. The conclusion is that the validity of such

responses is quite good, provided that questions clearly address subjective appreciation with one's life as a whole. Still there are persistent qualms about the reliability of answers to questions about happiness.

#### *Reliability biases*

Even if responses to questions about happiness reflect the respondents' life satisfaction, they may do this inaccurately. Responses can be distorted in several ways, some of which are listed below.

*Desirability bias:* It has been suggested that desirability bias produces unrealistically high scores on happiness; for instance self-ratings of happiness tends to be slightly higher in personal interviews than on anonymous questionnaires (Phillips & Clancy 1972).

*Interviewer bias:* This occurs when responses are influenced by characteristics of the interviewer; for instance, if the interviewer is in a wheelchair, the benefit of good health is salient. Respondents in good health will then rate their happiness somewhat higher and the correlation of happiness-ratings with health variables is more pronounced (Smit et al. 1995).

*Extreme Response Bias (ERB):* Some respondents tend to tick the highest or the lowest option. Greenleaf (1992) found that this tendency is related to the age, education level, and household income of respondents, but not to their gender. Vulnerability varies across topics, in a study on positive and negative effects; Diener et al. (1991) report that mood intensity is quite vulnerable to extreme response bias.

*Contextual bias:* The presentation of the study, the conversational context (Smith et al, 2006) and the day of the week are among other factors that influence the response of interviewees. Responses to questions about satisfaction with one's life as a whole tend to be slightly more positive when asked on a Monday than on a Friday, Saturday or Sunday (Akay & Martinsson, 2009). Another bias of this kind is in the order of questions in an interview (Glenn & Taylor 1990). The order of questions has been proved to influence both the distribution of responses and the association with other variables, e.g. the observed correlation between happiness and income tends to be higher if the question on happiness follows after questions about income.

*Cultural measurement bias:* The above mentioned biases can be random or systematic. Random bias is no great problem in cross-national happiness research, since random distortions typically balance out in big samples. Systematic bias is trickier, in particular when cultural factors are involved. This is called 'cultural measurement bias'. The above mentioned biases can be random or systematic. Random bias is no great problem in cross-national happiness research, since random distortions typically balance out in big samples. Systematic bias is trickier, in particular when cultural factors are involved. This is called 'cultural measurement bias'.

Veenhoven (2012) estimates the degree to which cross-national differences in average happiness are distorted by cultural measurement bias. He concludes that this can explain at best some 5 percent of the variation. Although cultural measurement is thus not dramatic, it is

still worth knowing what particular biases are involved and whether these distortions can be corrected.

In this context the extreme response bias (Diener et al. 1991) deserves consideration, as this kind of bias appears to differ across cultures. Culpepper & Zimmerman (2006) have shown in a study done in an American university, that Hispanic students are more prone to extreme responses; Hispanic students were less likely to go for middle responses and would go more for extremes than their Anglo-Saxon counterparts. Likewise, Chinese students were less inclined to extreme responses than Caucasian students (Song et al. 2011). In a bi-ethnic comparison in Israel, Arab respondents have been shown to go more easily for extreme responses than their Jewish counterparts (Baron-Epel et al. 2010). In this respect, one can question the attempt of Johnson et al. (2005) to link response styles with Hofstede's measures, as those are themselves heavily depending also on response styles.

## **1.2 The '10 excess' phenomenon in responses to questions on happiness in different nations**

A particular type of extreme response bias (ERB) appears in responses to survey questions about happiness using a numerical response scale ranging from 0 to 10: in several countries the percentage of responses in the highest category (10) is surprisingly high and does not fit the unimodal distribution we typically see. In these cases the option '10' is more often ticked than the option '9'.

An example of such a frequency distribution is presented on [Figure 1](#). This is the case of Austria where the percentage of 10 responses is almost twice as high as the percentage of 9 responses, contrary to Australia, which shows a more classic unimodal curve. We call this the '10 excess' phenomenon.

As we will see in more detail in section 4, this pattern appears in many countries all over the world and is particularly frequent in Latin America and the Middle East.

## **1.3 Research questions**

Our goal with this paper was to give a first exploration to the 10 excess phenomenon: how often does it appear and where? What are the possible reasons behind this response pattern? Is this a reflection of reality or a matter of measurement bias? This is worth knowing as the 0-10 numerical response scale has become standard in happiness studies.

## **1.4 Plan of this paper**

We will first describe in more detail what we mean by 'happiness', how that is measured and how we define 'excess' in the most positive response possible (Section 2). Next we assess the prevalence of the 10 excess phenomenon, how often it occurs and in which nations in particular (Section 3). On that basis we suggest several possible explanations for this phenomenon and check these one by one (section 4). Most of the explanations we considered failed an empirical test. We conclude that some cultural bias is involved (section 5).

## 2 SUBJECT MATTER

### 2.1 Concept of happiness

In philosophy, the term 'happiness' is often used as an umbrella term to denote the good life in a broad sense. In contemporary empirical research, the term is mostly used for subjective satisfaction with life. In this tradition Veenhoven (1984) defines happiness as *the degree to which someone evaluates the overall quality of his or her present life-as-a-whole positively*. In other words, how much one likes the life one lives.

### 2.2 Measurement of happiness

Thus defined, happiness is something people have in mind, and happiness in this sense can therefore be measured using questioning. As such, happiness is a suitable subject for survey research. The survey question on happiness at stake in this paper reads as follows:

*"Taking all together, how satisfied or dissatisfied are you with your life as a whole these days. Please answer by ticking a number between 0 (or 1) and 10, where 0 (or 1) stands for dissatisfied and 10 for satisfied"*

0	1	2	3	4	5	6	7	8	9	10
<i>Dissatisfied</i>										<i>Satisfied</i>

### 2.3 Data on happiness in nations

This kind of questions has been used in several large scale survey studies, many of which are part of an international survey program, such as the Gallup World Poll, the World Values Survey, the European Social Survey, the Eurobarometer and the Latino Barometro. The observed distribution of responses in each of these many studies are gathered in the collection of 'Happiness in Nations' (Veenhoven 2013c), in which they are sorted on question type, defined by 1) the keyword used in the question, e.g. 'happiness', 2) the time frame addressed, e.g. 'these days', 3) the response scale, verbal or numerical and 4) the number of response options.

We used this collection of data responses and considered the findings obtained for questions that used a numerical response scale (type n), with at least 10 options, that is, either 1 to 10 scales, as in [figure 1](#), or 0 to 10 scales. This type of response scale has been used for that use the keyword 'happiness' or 'life-satisfaction' and also for ratings of one's life between 'best possible' and 'worst possible', a rating which is better known as the Cantril ladder (Cantril 1965).

To date these kinds of questions have been used in more than 5000 survey studies in the general public of nations and for 1367 of the surveys the full distribution of responses is reported, rather than only the mean and standard deviation. In section 3 we inspect the 10 excess responses in the 1367 distributions.

### 2.4 Identification of 10 excess in responses to survey question on happiness

We speak of '10 excess' when the number of 10 responses is higher than that of the number of 9 responses. The degree of excess is expressed in a Ten Over Nine ratio, that we call the TON. We speak of 10 excess when TON is greater than 1.

### 3 PREVALENCE OF 10 EXCESS

#### *In responses to questions on life-satisfaction*

Out of the 1367 distributions, 534 are on a numerical scale ranging from 0 to 10 and 833 on a scale ranging from 1 to 10. Since this small variation in scale length might make a difference, we considered them separately. For reasons of readability, we will present only the first 15 countries by alphabetical order in the tables to come, the complete results are available online<sup>3</sup>.

As a first step we inspected the distribution of responses, and we present an illustrative overview of the most recent scores on the 1-10 scale in 15 nations in [table 1](#).

We then assessed the frequency of the 10 excess in all 1367 surveys that have involved a question on life satisfaction. The frequency on a 1 to 10 scale is reported in [table 2a](#) and the frequency on the 0 to 10 scale in [table 2b](#). We also assessed the frequency of the pattern in questions about contentment, see [table 2c](#).

*Scale 1-10:* On the 833 distributions on scale 1-10 observed in 97 nations, 462 had a TON greater than 1, which is 55%. Among these 97 nations, 23 systematically had a TON higher than 1. These were: Argentina, Bosnia Herzegovina, Brazil, Colombia, El Salvador, Guatemala, India, Indonesia, Jordan, Luxembourg, Mali, Malta, Montenegro, Morocco, Peru, Philippines, Poland, Puerto Rico, Taiwan, Tanzania, Trinidad and Tobago, Uganda, Uruguay, Zimbabwe.

*Scale 0-10:* On the 534 distributions on scale 0-10 observed in 88 nations, 199 had a TON greater than 1, which represents a percentage of 37%. Among these 88 nations, 23 always had a TON higher than one: Belize, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Guyana, Honduras, Hong Kong, Jamaica, Macao, Nicaragua, Palestine, Peru, South Africa, Surinam, Trinidad and Tobago, Turkey, Uganda, Uzbekistan, Venezuela, Viet Nam.

#### *In responses to question on 'best-worst possible life (Cantril ladder)*

On the 48 distributions on the Cantril ladder scale, 18 had a TON higher than 1, which is 38%. The following countries presented a TON ratio of more than 1: Argentina, Brazil, China, Guatemala, Honduras, Italy, Japan, Jordan, Mexico, Pakistan, Peru, Slovakia, South Africa, Uganda, Uzbekistan, Venezuela, Viet Nam, Russia, and Pakistan.

We summarize these results by comparing the phenomenon in 6 geographical areas: Africa, Latin America, North America, Asia, Europe and Middle East. The 10 excess pattern appears in all parts of the world, but it is particularly present in Latin America and the Middle East as [table 3](#) shows.

As a robustness check, we considered the most recent distribution in each country separately, limiting to surveys held after the year 2006. The rates of 10 excess responses were similar (tables not shown).

## 4 EXPLANATIONS

Is there any system in this 10 excess pattern of responses to survey questions about happiness? We first considered whether this pattern is particular for cognitive evaluations of life. This appears to be the case it may reflect reality and next whether we deal with measurement bias.

### 4.1 Reflection of social inequality?

A possible explanation for this 10 excess phenomenon is that societal factors are responsible. In this hypothesis, the society with a high number of 10 responses would be characterized by a particularly privileged class, whose members would easily tick the top of the scale.

The Latin American countries, largely represented among the countries with a 10 excess, are also among the ones with the highest income difference. South Africa and Hong Kong, also present in the 10 excess list, are also among the most unequal countries in the world. However, this explanation faces many exceptions: much more equal societies frequently show a 10 excess, e.g. Luxemburg, Czech Republic, Austria, Mali. This is confirmed by the relatively low correlation between the TON ratio and income inequality measured with the Gini coefficient:  $r=+.28$ . Income distribution seems to have an impact on but its contribution seems rather small. Still more aspects of inequality may be involved.

### 4.2 Measurement bias?

If this pattern does not reflect reality, there must be measurement bias. The question is then: What kind of bias? Below we check some possibilities.

#### *A matter of grading culture?*

Ratings on the numerical scale of happiness could be influenced by the way school performance is graded in the country. For instance, a study<sup>4</sup> comparing the American, British and Dutch systems show that the first ones give the most top grades whereas it is nearly impossible to get a top grade in the Netherlands. The highest grade frequency is consistent in order with the TON, at least for these three examples, the America having the highest frequency of ten-excess and the Netherlands the least. We miss systematic data on grading culture that would be of much interest here.

#### *Part of a wider extreme response style?*

The 10-excess pattern observed in responses to questions about happiness can be part of a wider tendency to tick extreme response options. If so, that must manifest in ratings of other things than happiness, such as in responses to questions about one's income. We checked using

the World Values Survey, in the context of which respondents rated on which decile on the income ladder they stand, 1 being the lowest step and 10 being the highest step. Among the 54 nations for which data is available, 16 present a 10 excess in rating of their income and of these, only 3 also present a 10 excess for question on life satisfaction on a 1-10 scale, Brazil, Colombia, Trinidad and Tobago. Yet the highest income category was also chosen disproportionately in several nations that are not on the list of 10 excess in responses to happiness, such as, for instance France, the United Kingdom or the Netherlands. Venezuela, one of the countries that shows the 10 excess the most systematically for happiness does not show it for incomes. This was confirmed by the low correlation between the TON rate for happiness and TON rate for income:  $r=+.11$  for Venezuela. However, this comparison could be more fruitful if the compared item was less objective.

#### *A matter of survey technique?*

The phenomenon we observe might be caused by subtle differences in survey techniques, such as in the sampling of respondents, the place of happiness in the questionnaire and the behavior of the interviewer. If so, we can expect that TON differs across surveys in the same country. We checked using the countries where different survey programs had measured happiness on 1-10 or 0-10 numerical scales. To do so, we took the example of Brazil, a country that often presents the ten excess. We compared different surveys. Results are shown in [table 4a](#).

Variations can be seen between regions, years, scales but the ten-excess phenomenon is systematically present. We also the variance in TON within survey programs with variance in TON across survey programs. We compared the LAPOP, What World Thinks and PEW surveys asking the same question on contentment on a 0-10 scale in the years 2000. Results are presented in [table 4](#) below. The LAPOP presents the same survey in the years 2008 and 2010 and their difference are very small, with a variance of 0.05. The variance among the three types of surveys is much more important(0.5), which seems due to the fact that the TON is much higher in the What World Thinks survey (2.37) whereas LAPOP (1.32) and PEW(1.38) are very close. The surveys show different results but the phenomenon is still systematically present.

#### *Particular to 1-10 scale?*

We first hypothesized that the 10 excess phenomenon is typical for short response scales and therefore occurs more often on 1-10 scales than on the 0-10. People might be less prone to go to 10 once they have imagined what zero means versus 1 which is less extreme. This was found to be the case: the 10 excess was rather less present on a 0 to 10 scale (37%) than on a scale from 1 to 10 (55%). However, if a difference can be observed, it still represents a high percentage of the distributions in both cases.



*Particular to extreme labeling of scale end?*

The 10 excess phenomenon could be more common if the positive end of the rating scale is labeled modestly, using terms such as 'satisfied' or 'happy', rather than with stronger terms such as 'completely satisfied' or 'extremely happy'. To check this explanation we selected pairs of questions used in the same country in the same period, that differed only in the labeling of the extremes of the numerical response scale. The only match in terms of length of scale, period and measure type are the questions<sup>5</sup> O\_SLW\_c\_sq\_n\_10\_a (World Values Survey, wave 1-5, 1990-2005) and O\_SLU\_c\_sq\_n\_10\_b (European Quality of Life Survey 2003). Both address life satisfaction on a 1 to 10 scale in European nations between 1990 and 2005. However, whereas the first one ranges from 'dissatisfied' to 'satisfied', the second one ranges from 'very dissatisfied' to 'very satisfied'. As shown in [table 4](#), the prevalence of the 10 excess is exactly the same in both cases (36%), so there is no difference in the only comparison case we have.

*Particular to numerical response scales?*

Still another possibility is that the 10 excess pattern occurs typically on numerical scales, because the number 10 is open to more interpretations than a word like 'satisfied'. Ideally this requires a comparison with responses scales with an equal number of verbal response options. Such cases are not available however; the longest verbal response scales provide only seven options.

Therefore we compared means obtained using numerical scales to the mean scores on verbal response scales, which were later transformed to a secondary 0-10 numerical scale. To that end, we selected average values: for numerical scales, we used the average mean score given for a 11-step numeral Life Satisfaction scale (Table 122F) and for verbal scales, the average values given for 4-step scales (Table 111 C), this data for both was available in the collection 'Happiness in Nations' of the World Database of Happiness<sup>6</sup>. We then assessed whether the means on the numerical response scales tended to be higher than the means obtained using verbal response scales. We repeated this analysis for the countries where 10 excess responses were observed.

The differences between average scores on the numerical scale, 1 to 10, and a verbal scale, very unsatisfied to very satisfied, that was projected on a numerical scale to see if some differences could be observed are presented in [table 5](#). There are differences between the responses to the two types of scale, but no systematic differences; in our 10 excess list, some countries like Argentina or Brazil offered quite a large difference between the verbal and the numerical scale, which might tell us that this excess came from a scale effect; however, when looking at Venezuela, Colombia and Costa Rica, the results on the two scales were the same and in some cases, the result on the verbal scale was even higher than the one on the numerical scale.

We computed the difference between average scores obtained using a numerical scale and

verbal scale; a 4-step numerical scale was more vulnerable to excess responding than a 10 or 11 step scale. When subtracting scores on a verbal scale from average score on the numerical scale, the difference was +0.32 in the case of the countries that did not present a 10 excess, and +0.16 in the case of the countries presenting a 10 excess. Therefore, the difference was even smaller in the countries presenting a TON effect. So numerical responding does not seem to explain the bias in responses to happiness questions, quite the contrary.

#### *Social desirability bias?*

Happiness is highly valued in most societies and claiming to be very happy could be a way to obtain prestige and social acceptance. Therefore we checked social desirability. In a study among college students in 41 nations, Diener (2000) assessed the degree of life-satisfaction they deemed *ideal*. Ideal scores range from 19.80 (China) to 31.14 (Australia)<sup>7</sup>. Ideal happiness tends to be higher in 10 excess nations; e.g. in Puerto Rico (30.70), Colombia (31.12), Brazil (29.07), Peru (28.98) and Argentina (27.72). Yet the two countries with the highest ideal happiness, Australia (31.14) and Spain (31.02), are not among the countries that frequently present a 10 excess. The correlation between the ideal life satisfaction and the TON ratio is +.27, thus the valuing of happiness does seem to be involved, but since the correlation is modest this is not the whole story.

#### *Check of the bias explanation*

The above analyses suggest that the 10-excess phenomenon is at least partly due to measurement bias. If so, scores of average happiness in nations are often inflated and will as such lower the correlation with nation characteristics, such as the income per head. This allows us to check whether measurement bias is really involved and to get a view on the size of this bias.

In that vein we explored the effect of three corrections for 10-excess in the distribution of happiness in nations. First we simply changed the frequencies of 9 and 10 for the countries presenting a ten-excess. Second, we reduced the 10 scale by combining the responses in the following way: 1-2, 3-4, 5-6, 7-8 and 9-10. Third we applied a more complicated method in which we computed the ten over nine (TON) ratio for the 371 distributions on a 1-10 scale that do not present a 10 excess; the average TON was 0.64. We made the assumption that this ratio is a better reflection of reality and we applied it to countries presenting the 10 excess to remove the bias; we then computed a new percentage of 10 respondents by multiplying the number of 9 respondents by 0.64, thus obtaining a corrected 10 percentage, which was lower than in the original data. The sum was then lower than 100%; so we computed a new average with the corrected percentage of ten respondents to reach 100% by multiplying the average by  $(100/(100 - ((\text{original } 10) - (\text{corrected } 10)))$  so the 10 excess was distributed over all the bars, respectively of their proportional weight.

The question is then whether these corrected means of happiness in nations correlate better with societal quality than the uncorrected original means. We examined that 97 nations

around the year 2000, using the nation characteristics: buying power per capita, the human development index, government effectiveness and economic freedom. Data were drawn from Veenhoven's (2013e) 'States of Nations'. The results are presented in [table 7](#). These variables explained 69% of the variance in uncorrected average happiness in nations. When corrected averages happiness was used, the explained variance rose to 71% in the case of the 9-10 Swap, 70% in the case of the merge and to 74% for the TON 0.64 method. So in all cases, there was a gain in explained variance. This confirms that considerable measurement bias is involved in the '10 excess' phenomenon. The bias is possibly greater than these, discutible, corrections can show.

Correcting this extreme response bias could possibly be done in many other ways, e.g. by squeezing the observed distribution on this 0-10 numerical scale into a reference distribution obtained using a survey question on the same topic in the same year with a different response scale (De Jonge et al. 2013). The purpose of this paper is not to select the best correction; as for now, it is sufficient to demonstrate the plausibility of bias.

#### 4.3 10-excess typical for cognitive evaluation of life?

So far we considered the 10-excess pattern in responses to questions on life satisfaction and on the Cantril ladder that invites for a rating between the best and worst possible life. Both these questions invite a cognitive evaluation of life. Does the same pattern appear in responses to more affectively toned questions?

As yet we did not consider questions that use 'happiness' as the keyword. The reason is that responses to that question are mostly recorded on shorter scales with verbal response options, such as 'very happy'; data on numerical ratings of 'happiness' and 'mood' are scarce. Still the European Social Survey includes a question with 'happiness'<sup>8</sup> as the key word. Responses on which are recorded on the same 0-10 numerical scale as the question on life-satisfaction<sup>9</sup> used in that survey. This enables us to check whether the same response pattern appears the more affectively toned question. We find a noticeable difference, 25% 10-excess in responses to the question on 'satisfaction' and only 10% in responses to the question on 'happiness'. So, affective measures seem to be less vulnerable to the extreme responding than more cognitive measures, at least in Europe.

This difference can be understood in the context of the theory that we draw on two sources of information when evaluating our life; how well we feel affectively most of the time and to what extent we perceive that life meets standards of the good life (Veenhoven 2009). The question on 'happiness' reflects the former affective appraisal more than the question on 'life-satisfaction' and this gives rise to slight variations in correlation with other variables, such as with income (McKennell 1978).

In that context it seems that we are better in grading how well we feel, than in judging how successful we are in meeting standards. One reason is that there are many standards for judging life and performance on these is not always clear. It is easier to rate how you feel than rate the distance to the best possible life'. The more fuzzy an object is, the more vulnerable its evaluation is for side influences, such as the above discussed sources of bias.

## 5 CONCLUSIONS

Survey questions on happiness that use 0-10 numerical response scales often elicit more ratings on option 10 than on option 9. This '10-excess' pattern is most common in Latin America and the Middle East. At least part of the phenomenon is due to cultural measurement bias and questions that invite to a cognitive evaluation are particularly vulnerable. Further research is required into the nature of this bias and its correction.

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## NOTES

<sup>3</sup> Complete dataset : [http://gaelbrule.com/data/10\\_excess](http://gaelbrule.com/data/10_excess)

<sup>4</sup> <http://www.studyinholland.nl/documentation/grading-systems-in-the-netherlands-the-united-states-and-the-united-kingdom.pdf>

<sup>5</sup> Codes used in the collection 'Measures of Happiness' of the World Database of Happiness (Veenhoven 2013f)

<sup>6</sup> Transformation from verbal to numeral scores were obtained using experts ratings; for instance very satisfied corresponds to a 9.3 on a 0-10 scale, satisfied to a 6.5, quite unsatisfied to a 3.7, and very unsatisfied to a 1.3 (Veenhoven, 1993: section 7/3.3.2). It is then possible to obtain a value on a 0 to 10 scale from a distribution of verbal answers.

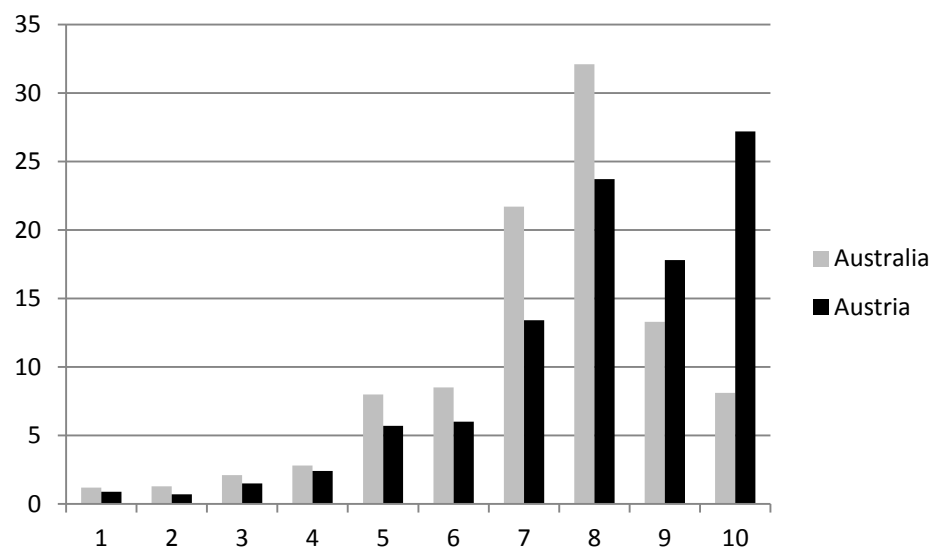
<sup>7</sup> Ratings were made on the 5 item Satisfaction With Life Scale (SWLS), possible scores on which range from 7 to 35

<sup>8</sup> Taking all things together, how happy would you say you are ?

<sup>9</sup> All things considered, how satisfied are you with your life as a whole nowadays?

<sup>10</sup> Life Satisfaction in 90 nations, scale 1-10, Happiness in Nations (Veenhoven 2013c), table 122F

<sup>11</sup> For complete info see: [http://worlddatabaseofhappiness.eur.nl/hap\\_nat/nat\\_fp.php?cntry=30&name=Brazil&mode=3&subjects=47&publics=6](http://worlddatabaseofhappiness.eur.nl/hap_nat/nat_fp.php?cntry=30&name=Brazil&mode=3&subjects=47&publics=6)

**Figure 1****Two distributions of responses to a single question about life satisfaction***Classic, Australia 2005 and 10 excess, Austria 1999*

**Table 1**

**Distribution of responses to a question on life-satisfaction in the years 2006-2009 on a 1-10 numerical scale**

*First 15 cases out of 90*

	1	2	3	4	5	6	7	8	9	10	TON ratio
Albania	4,6	6	15,4	15,9	16,7	11,7	11,3	10,2	5,3	2,7	0,51
<b>Algeria</b>	12,6	5,6	8,4	5,9	12,9	10,5	13,6	11,5	6,3	11,9	<b>1,89</b>
Andorra	0,5	0,4	1,3	2,5	12,5	13,3	23,1	29,7	9,9	6,7	0,68
<b>Argentina</b>	1,2	0,7	2	1,4	7,3	5,3	18,8	26,6	13,4	22,5	<b>1,68</b>
Armenia	14,3	10,5	16,5	12,8	17	9,3	8,2	5,7	2,9	2,5	0,86
Australia	1,2	1,3	2,1	2,8	8	8,5	21,7	32,1	13,3	8,1	0,61
<b>Austria</b>	0,9	0,7	1,5	2,4	5,7	6	13,4	23,7	17,8	27,2	<b>1,53</b>
<b>Bangladesh</b>	3,3	1,1	7,5	10,5	35	9,3	8,9	10,6	2,9	9,5	<b>3,28</b>
Belarus	6,8	8,3	14,2	13,5	21,5	8,9	10,1	8,1	3,3	1,9	0,58
<b>Belgium</b>	3	0,7	1,7	2,6	6,3	7	15,9	29,4	15,7	16,8	<b>1,07</b>
<b>Bosnia</b>	7,3	3,3	5,1	8,6	24,3	13,3	13,2	11,6	5,3	7,8	<b>1,47</b>
<b>Brazil</b>	1,9	0,9	1,4	2,2	10,9	8,6	12,4	23,8	13,4	24,3	<b>1,81</b>
Bulgaria	5,8	6,6	11,3	11,6	18,7	11	14,9	8	4,8	2,8	0,58
<b>Burkina</b>	3,6	4,6	6,7	12,1	26	15,2	11,1	8,2	3,1	7	<b>2,26</b>
Canada	0,8	1,2	1,4	2,6	6	7,3	14,1	28,6	19,4	18,6	0,96

Data: Happiness in Nations (Veenhoven 2013c), table 122F

**Table 2a**

**10 excess frequency in responses to a question on life satisfaction on a 1-10 numerical scale**

*First 15 cases out of 97*

	Surveys with TON>1	Total number of surveys	Ratio
Albania	0	6	0,00
Algeria	4	6	0,67
Andorra	0	4	0,00
<b>Argentina</b>	<b>11</b>	<b>11</b>	<b>1,00</b>
Armenia	4	8	0,50
Australia	1	9	0,11
Austria	3	4	0,75
Azerbaijan	2	9	0,22
Bangladesh	11	14	0,79
Belarus	3	10	0,30
Belgium	2	6	0,33
<b>Bosnia Herzegovina</b>	<b>4</b>	<b>4</b>	<b>1,00</b>
<b>Brazil</b>	<b>10</b>	<b>10</b>	<b>1,00</b>
Bulgaria	4	16	0,25
Burkina Faso	6	9	0,67
<b>All 97 cases</b>	<b>462</b>		<b>0.54</b>

Data: Happiness in Nations (Veenhoven 2013c), table 122F

**Table 2b**

**10 excess frequency in responses to a question on life satisfaction on a 0-10 numerical scale**

*First 15 cases out of 88*

	Number of surveys with TON>1	Total number of surveys	Ratio
Angola	0	1	0,00
Argentina	1	5	0,20
Australia	4	6	0,67
Austria	3	6	0,50
Bangladesh	0	2	0,00
Belgium	1	14	0,07
<b>Belize</b>	<b>1</b>	<b>1</b>	<b>1,00</b>
Bhutan	7	22	0,32
Bolivia	2	5	0,40
<b>Brazil</b>	<b>7</b>	<b>7</b>	<b>1,00</b>
Bulgaria	6	8	0,75
Canada	3	6	0,50
<b>Chile</b>	<b>4</b>	<b>4</b>	<b>1,00</b>
China	1	3	0,33
<b>Colombia</b>	<b>3</b>	<b>3</b>	<b>1,00</b>
<b>All 88 cases</b>	<b>199</b>	<b>534</b>	<b>0.37</b>

Data: Happiness in Nations (Veenhoven 2013c), table 122G

**Table 2c**

**Distribution of responses to a question on 'Best-Worst possible life' (Cantril ladder) in the years 2006-2009 on a 11-step numerical scale**

	0	1	2	3	4	5	6	7	8	9	10	TON ratio
Angola	2,50	10,00	8,70	16,80	20,20	20,30	10,10	5,50	3,30	0,80	0,60	0,75
<b>Argentina</b>	4,50	1,60	2,20	5,40	7,20	19,50	13,80	16,30	17,00	4,90	7,00	<b>1,43</b>
Bangladesh	0,00	2,10	16,80	8,80	21,30	28,10	9,60	4,80	5,70	1,80	0,60	0,33
Bolivia	1,20	2,90	4,20	6,70	11,90	29,50	12,70	12,90	9,40	4,10	3,90	0,95
<b>Brazil</b>	1,80	2,10	2,80	6,10	7,80	21,00	14,70	13,10	14,50	3,80	11,30	<b>2,97</b>
United Kingdom	0,80	0,50	2,30	4,20	6,70	21,40	10,90	21,50	19,90	6,60	4,60	0,70
Bulgaria	5,70	7,80	12,30	19,30	16,60	21,20	7,10	4,30	3,30	0,60	0,20	0,33
Canada	0,40	0,30	0,60	1,10	3,90	15,50	10,50	22,90	29,00	7,90	6,90	0,87
<b>China</b>	3,10	2,60	2,90	6,80	9,20	32,90	19,40	10,10	9,50	1,70	1,80	<b>1,06</b>
Czech Republic	1,00	0,00	1,00	4,40	9,30	27,50	16,00	22,90	13,20	2,60	2,00	0,77
Egypt	0,10	0,20	1,20	4,10	7,70	18,70	22,40	18,30	15,50	7,90	3,20	0,41
France	0,00	0,40	1,60	1,20	4,90	20,90	14,20	28,20	22,90	3,90	1,60	0,41
Germany	0,80	0,70	1,80	3,90	5,80	22,70	15,10	21,60	18,50	4,90	3,60	0,73
Ghana	1,00	2,60	7,40	16,40	19,50	26,20	14,10	7,50	2,10	0,60	0,30	0,50
<b>Guatemala</b>	1,00	0,40	0,20	1,20	3,60	11,60	10,20	17,40	29,00	11,40	13,60	<b>1,19</b>

Data: Happiness in Nations (Veenhoven 2013c), table 31D

**Table 3: TON distribution in parts of the world<sup>10</sup>**

	TON >1/total	Ten excess frequency(%)
Africa	8/11	73
Latin America	10/10	100
USA/Canada	0/2	0
Asia	7/17	42
Europe	17/40	42
Middle East	10/10	100
<b>Total</b>	<b>52/90</b>	<b>58%</b>

**Table 4a Comparison of surveys in Brazil in various years**

Year	Measure <sup>11</sup>	Characteristics	N	Survey	0	1	2	3	4	5	6	7	8	9	10	TON
2002	C-BW-c-sq-l-11-c	18+ aged, general public, Brazil	1 000	WhatWorldThinks 2002	1,80	2,10	2,80	6,10	7,80	21,00	14,70	13,10	14,50	3,80	11,30	2,97
2008	C-BW-c-sq-l-11-c	18+ aged, general public, Brazil	1 353	LAPOP 2008	0,89	0,37	1,03	3,10	4,43	15,59	15,15	17,81	19,07	10,35	12,20	1,18
2010	C-BW-c-sq-l-11-c	18+ aged, general public, Brazil	2 010	LAPOP 2010	0,90	0,52	0,76	1,90	3,85	14,27	14,03	18,60	23,17	8,90	13,08	1,47
2007	C-BW-c-sq-l-11-c	18+ aged, general public, Brazil	1 000	PEW survey 2007	1,20	1,60	1,00	2,60	4,60	14,70	11,60	18,00	21,30	9,70	13,40	1,38
1975	C-BW-c-sq-m-11-a	16+ aged, general public, Brazil	382	Kettering Survey	1,00	2,00	2,00	5,00	8,00	21,00	19,00	14,00	14,00	5,00	9,00	1,80
1975	O-SLW-c-sq-m-11-a	16+ aged, general public, Brazil	382	Kettering Survey	1,00	1,00	2,00	3,00	5,00	13,00	11,00	17,00	18,00	12,00	16,00	1,33
2006	O-SLW-c-sq-n-10-a	18+ aged, general public, Brazil	1 495	WorldValuesSurvey 5	-	1,90	0,90	1,40	2,20	10,90	8,60	12,40	23,80	13,40	24,30	1,81
1998	O-SLW-c-sq-n-10-a	18+ aged, general public, Sul, South region, Brazil	414	WorldValuesSurv 1-5	-	2,60	0,70	2,50	4,10	11,70	10,00	13,40	21,70	9,30	23,80	2,56
1998	O-SLW-c-sq-n-10-a	18+ aged, general public, Brazil	1 471	WorldValuesSurv 1-5	-	3,50	2,20	3,10	3,60	14,60	7,60	11,30	16,30	9,00	28,20	3,13
1998	O-SLW-c-sq-n-10-a	18+ aged, general public, Nordeste, Brazil	268	WorldValuesSurv 1-5	-	7,10	3,70	3,70	1,90	11,50	10,00	10,00	11,20	6,70	33,80	5,04
1998	O-SLW-c-sq-n-10-a	18+ aged, general public, North West region, Brazil	523	WorldValuesSurv 1-5	-	2,50	1,80	2,80	4,00	13,90	6,90	11,90	14,80	8,90	32,00	3,60
1998	O-SLW-c-sq-n-10-a	18+ aged, general public, Minas Gerais region, Brazil	230	WorldValuesSurv 1-5	-	0,00	0,00	0,80	3,40	11,10	13,20	15,10	23,60	7,50	25,20	3,36
1998	O-SLW-c-sq-n-10-a	18+ aged, general public, Rio de Janeiro region, Brazil	190	WorldValuesSurv 1-5	-	1,80	0,90	0,00	1,40	10,30	8,60	17,60	22,40	14,30	22,70	1,59
1998	O-SLW-c-sq-n-10-a	18+ aged, general public, São Paulo region, Brazil	428	WorldValuesSurv 1-5	-	2,70	1,70	1,60	2,60	13,30	8,40	9,80	23,20	13,00	23,20	1,78
1990	O-SLW-c-sq-n-10-aa	18+ aged, general public, Brazil, 1990	1 502	WorldValuesSurvey 2	-	2,98	1,29	2,33	3,72	14,31	7,39	13,11	17,11	8,81	28,24	3,21
1996	O-SLW-c-sq-n-10-aa	18+ aged, general public, Brazil, 1996	1 149	WorldValuesSurvey 3	-	4,87	2,96	3,66	3,74	13,14	8,79	9,66	14,88	8,62	29,33	3,40
2007	O-SLW-c-sq-n-11-a	15+ aged, general public, Brazil, 2007	1 035	GallupWorldPoll2007	0,60	0,70	1,10	1,70	2,90	9,40	10,60	16,50	24,70	9,50	22,50	2,37

**Table 4b comparison of variance between surveys in Brazil**

	Variance
Variance within LAPOP surveys	0.05
Variance among surveys	0.5



**Table 5****Comparison of two types of surveys**

	Labeling	Number of surveys for European countries	Number of surveys presenting a 10 excess	Ratio of surveys presenting the 10 excess
O_SLW_c_sq_n_10_a (World Values Survey, wave 1- 5, 1990-2005)	'dissatisfied' to 'satisfied'	149	54	36%
O_SLU_c_sq_n_10_b (EQLS 2003)	'very dissatisfied' to 'very satisfied'	28	10	36%

**Table 6**

**Mean scores on pairs of questions on life satisfaction in the same country and period**  
*0-10 numerical scales compared to transformed scores on a 4 step verbal response scales*

Country	Average score on 0-10 numerical scale	Average score on equivalent question rated on a verbal response scale and transformed to range 0-10	Difference
Argentina	7,3	6,39	+0,91
Armenia	5	4,78	+0,22
Austria	7,6	6,7	+0,90
Belarus	5,2	5,5	-0,30
Belgium	7,3	6,85	0,45
Belize	6,6	6,64	-0,04
Bolivia	6,3	6,12	0,18
Brazil	7,5	6,6	0,90
Bulgaria	4,4	4,17	0,23
Canada	7,8	7,91	-0,11
Chile	6,7	6,49	0,21
China	6,3	6,11	0,19
Colombia	7,7	7,39	0,31
Costa Rica	8,5	7,74	0,76
Croatia	6	5,94	0,06
<b>Average</b>	<b>6.65</b>	<b>6.4</b>	<b>0.25</b>

Data: Happiness in Nations (Veenhoven 2013c), tables 121C and 122F.

**Table 7****Explained variance in average happiness in 97 nations around 2005***With and without correction for 10 excess bias*

<b><i>Average happiness in nation</i></b>	<b><i>Explained variance</i></b>
No correction	69%
Merge 10 step scale into 5 step scale	70%
Swap 9 10 scores	71%
Transform to TON 0.64	74%

All the correlations are significant at the 0.01 level

Data: States of nations (Veenhoven 2013e) variables RGDP\_2005, HDI\_2009, GovEffectiveness\_2006, FreeEconIndex1\_2005