

# THE MEDICINE IS WORSE THAN THE DISEASE

## Comment on Delhey and Kohler's proposal to measure inequality in happiness using 'instrument-effect-corrected' standard deviations

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### **ABSTRACT**

*Inequality of happiness in nations can be measured using the standard deviation of responses to surveys questions. The standard-deviation is not quite independent of the mean, being zero when everybody is maximally happy or unhappy while the possible value of the standard deviation is highest when the mean is in the middle of the response scale. Delhey and Kohler see this intrinsic dependency as a problem and propose two ways to compute 'corrected' standard deviations. I advise against this medicine. One reason is that there is no real disease, since the presumed problem does not occur with commonly used numerical rating scales of 10 or more steps. The second reason is that one of Delhey and Kohler's medicines have side effects, their first correction affects the mean and their second correction is based on implausible assumptions. A third reason is that there are better ways to estimate the effect happiness-inequality net happiness-level.*

*Partiallying out mean happiness did not affect the non-correlation between inequality of income and inequality of happiness in an analysis of 116 nations.*

In this issue Delhey and Kohler address the question of how to assess inequality of happiness in nations. This is an important question that may also have consequences for the measuring of inequality in other things than happiness. In an earlier paper I have argued that the standard deviation is an appropriate statistic for this purpose, next to the mean absolute difference, the mean pair difference and the inter-quartile range (Kalmijn & Veenhoven 2005). Delhey and Kohler consider some possible weaknesses of the standard deviation and propose two ways for correcting these. I admire their creativity, but doubt that this provides a better picture of reality.

### **1 CORRECTION OF REALITY**

Delhey and Kohler's main concern is that the standard deviation is not quite independent of the mean: the standard deviation is zero when everybody is completely happy or completely unhappy and the standard deviation has its theoretical maximum in the middle of the scale. Delhey and Kohler see this as a 'technical bias', which needs 'correction'. I see it as a reality phenomenon; there is complete equality of happiness when everybody is completely (un)happy in a country. Correcting' this reality involves a distortion of reality.

### **2 MEDICINE NOT NEEDED**

Still one can be interested in inequality of happiness net of the level of happiness. Should one then take Delhey and Kohler's medicine, risking its side effects?

### 2.1 *Problem can be evaded*

In this case there is only a problem with survey question that use 7 answer options or less, such as the 4-step question in life satisfaction used in the Eurobarometer surveys. There are few problems with the 10 and 11-step numerical scales. With such response scales the dependency of the standard deviation on the mean occurs only at extreme levels of the mean that do not exist in reality. We noted that earlier in Kalmijn & Veenhoven (2005: 372) and the simulations of Delhey & Kohler on figure 3 and 4 show the same.

Most survey findings on happiness in nations are based on questions using 10 or 11 step numerical response scale, even more so now that the Gallup World Poll has entered the scene with its 0-10 question on life-satisfaction, and for this reason the Rank Reports of the World Database of Happiness are based on means and standard-deviations on scale 0 to 10 (Veenhoven 2010a and b).

### 2.2 *No inverted U pattern*

In the top panel of figure 1 in their paper, Delhey and Kohler present a plot of mean against raw standard deviations. In line with their prediction, a (very) shallow inverted U-curve appears with its top at the middle of this scale. This picture is based on 52 nations taken from the 2007-2007 wave of the World Values Survey. Since numbers can make a difference I checked whether this pattern reproduces in the larger set of 116 nations available in the World Database of happiness<sup>1</sup>. It does not. Yet when I selected the same 52 nations Delhey and Kohler used I did see the same pattern. So the inverted U seems to be an artifact of the nations that happened to be in WSV5.

## 3 **MEDICINE WORSE**

A medicine may be worse than the disease. In this case I see a side effect in correction IEFF<sup>A</sup> while correction IEFF<sup>B</sup> leads into dubious assumptions about the nature of happiness.

### 3.1 *Correction of the standard deviation requires similar correction of the mean*

Delhey and Kohler's favored correction is a relative standard deviation, which they call 'percent maximum standard deviation' (IEFF<sup>A</sup>). In that approach the dependency of the standard deviation of the mean is eliminated by dividing the observed standard deviation by its maximal possible value at a given mean. For example, in the case of a 0-10 scale the maximal standard deviation is 5 at a mean level of 5. At a mean level of 8 the standard deviation can maximally be 4. If a standard deviation of 3 is observed at that mean level the standard deviation is upgraded to 3,75 taking  $\frac{3}{4}$  of 5.

In this case where the standard deviation is 3, this also restricts the possible value of the mean to 9, while the maximal value on the scale is 10. So computation of a relative standard deviation should be accompanied by computation of a relative mean, which in this case would be upgraded to 8,88. Together these artificialities bring us from the frying pan into the fire.

### 3.2 *Happiness is not normally distributed*

In their argumentation for correction IEFF<sup>B</sup> Delhey and Kohler further assume that happiness is normally distributed in the population and that the skewed distributions we observe in surveys are an artifact of limited response scales.

This strikes me as implausible. In conditions that are livable for a species most exemplars live healthy, health is the default stat and illness the exception. Consequently health is typically not normally distributed. Likewise most people are happy in present day

society, due to its high degree of livability (Veenhoven 2010). That many things are normally distributed does not mean that everything is normally distributed. Consequently the normal distribution is also not an appropriate model for happiness. The beta distribution is more apt for this kind of variables, as demonstrated by Kalmijn et al (2010, Kalmijn 2010 Appendix H).

Delhey and Kohler claim to have corroborated their normality assumption in their analysis of distributions observed in eight countries participating in the World Values Survey. Yet this exercise does not convince, since they selected cases where the mean is close to the mid-scale. In this issue Wim Kalmijn (2011) does a better job with a test on a common skewed sample distribution. Using probit analysis he shows that the corresponding distribution in the population must also be skewed.

### 3.3 *Happiness is not unlimited*

Happiness is measured using bounded response scales that typically vary between 0 and 10. In line with their normality assumption, Delhey and Kohler also assume that the actual distribution in the population covers a broader span. This assumption is depicted on their figure 2. On this basis they argue that standard deviation observed on bounded scales tend to be under estimated, forgetting that the mean is also affected.

Limitation of response options may be a problem for the response scale used in the World Values Surveys, where the extremes are labeled 'dissatisfied' (1) and 'satisfied' (10). Respondents happier than just 'satisfied' may have crowded in the 10 category. Congestion at the extremes is less likely to occur with scale labels 'extremely unhappy' and 'extremely happy' as used in the European Social Survey, since one can hardly be happier than 'extremely' happy. Comparison of standard deviations obtained with both kinds of scales in the same nations shows no systematic difference<sup>2</sup>.

At a more basic level I object to the idea that human experience is unlimited in range. Limitations have been demonstrated for perceptual experiences such as seeing and hearing and is likely to exist also for hedonic feeling. Momentary ecstasis should not be mixed up with happiness in the sense of the overall enjoyment of one's life-as-a-whole.

## 4 **TRADITIONAL TREATMENT YIELDS DIFFERENT RESULT**

There are alternative methods for ruling out the effect of mean happiness on dispersion of happiness. One such alternative is to partial mean happiness out in the correlation between inequality of happiness and another variable. An advantage of that approach is that you know what you are doing, that is, wiping away all the common variance between mean and standard deviation of happiness.

Using that method I checked whether level of happiness confounds a negative effect of income-inequality on happiness-inequality. In the above mentioned set of 116 nations I found a zero-order correlation of +.07 between inequality of income<sup>3</sup> and inequality of happiness as measured with the raw standard-deviation. This correlation was reduced to +.06 when mean happiness was partialled out. This minimal difference supports my earlier conclusion that there is no technical problem.

I repeated this analysis on the 52 nations used by Delhey and Kohler. I found a similar small zero-order correlation of -.04, which changed to +.38 when mean happiness was partialled out. This is another indication that the data set has played them false.

## **5 IN CLOSING**

The quest for new medicines adds to our health. Yet such progress can involve flops not to speak of iatrogenic deaths. This medicine seems to be one of the latter kind.

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**NOTES**

<sup>1</sup> I used the dataset 'States of Nations' (Veenhoven 2010c), which is available on request. This dataset involves 116 nations over the years 2000-2009. The dataset involves estimates of both level and inequality of happiness in nations based on responses to a single direct question on life-satisfaction rated on a 0-10 numerical scale. The estimates of the mean and standard deviation are more accurate because they do not depend on one single survey. If equivalent questions had been used in more than one survey in a country in this period the average was used. Level of happiness in nations (mean) measured with variable HappinessLS10.11\_2000\_2009. Inequality of happiness in nations (raw standard deviation) measured with variable SD\_HappinessLS10.11\_2000\_2009.

<sup>2</sup> This comparison involved responses to variants of the life-satisfaction item that had been used in the same country in the same one to two year period. Five such pairs of differently labeled questions using a 1-10 numerical scale were taken from table 122D of the collection Happiness in Nations of the World Database of Happiness (Veenhoven 2010d). Another 20 pairs of questions using a 0-10 rating scale were found in table 122E. This selection is available on request. Inspection shows no greater percentage of responses in the 10 category on scales where the extreme is labeled 'satisfied' than on scales where it is denoted with labels such as 'completely satisfied'. I also did not observe a systematic difference in standard-deviations.

<sup>3</sup> Income inequality in nations (Gini coefficients) measured with variable IncomeInequality1C\_2000.