

Happiness Is Universal, Unidimensional, Cardinaly Measurable and Interpersonally Comparable: A Basis for the Environmentally Responsible Happy Nation Index

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Abstract

Though the various improvements and different measures of many aspects related to well being proposed by the Sarkozy Report will be very useful, an overall national success indicator to supplement/replace the traditional focus on GDP is needed. As an ultimate indicator, it has to be happiness-based. This paper argues that happiness is universal and unidimensional and is also cardinally measurable and interpersonally comparable. The happy nation index takes both the average net happiness and average lifespan into account. Since there is the future and there are other nations, a more appropriate national success indicator from a long-term and global perspective is to also take negative account of the external benefits/costs (perhaps starting with greenhouse gases) conferred/imposed on the future and on other nations. An environmentally responsible happy nation index may then be constructed. If politicians and the public pay more attention to such an index, efforts will be directed towards things that are of ultimate value and also on a globally sustainable basis.

1. Introduction

The report commissioned by French President Nicholas Sarkozy on the Measurement of Economic Performance and Social Progress has been published for more than a year. However, as mentioned by the report itself, 'The Commission regards its report as opening a discussion rather than closing it'. Let us continue this discussion.

Recent studies on happiness by psychologists, sociologists and economists have more-or-less reached a near consensus that "per-capita GDP is an imperfect index of economic

welfare ... Its weaknesses are more serious than many believe" (Frank 2011). I used to think that the rate of growth in per-capita GDP would probably be a better measure. However, the results of Easterlin (2011), Graham & Lora (2009) and others suggest that the reverse may be closer to the truth. Graham & Lora call this the "paradox of unhappy growth".

Also, over the past two and a half decades of economic stagnation, Japan has actually climbed up the happiness or life satisfaction scale very sharply. Before its economic stagnation commencing around the end of 1980's, Japan scored at or close to the bottom of the happiness scale. For the World Values Survey 1994, happiness index in Japan reaches just-below-average. By the surveys over 2002 – 2004, happiness index for Japan already reaches above average (Leigh & Wolfers 2006). On the other hand, from 1987-2004, average working hours in Japan decrease 0.7% per annum, and a cumulated reduction of much more than 10% in all. [Figures to be updated.] Perhaps, realizing their futile quest for higher incomes by working too hard, the Japanese have slowed down and achieved much higher levels of happiness. I call this the "rise of Japan" (an instance of the paradox of happy stagnation, the sister of the paradox of unhappy growth?), in contrast to its more well-known economic stagnation!

Thus, I strongly support the recommendation of the Sarkozy report 'to shift emphasis from measuring economic production to measuring people's well-being. And measures of well-being should be put in a context of sustainability'. However, I disagree that 'To define what well-being means a multidimensional definition has to be used'. In the next section, I argue that well-being or happiness is one dimensional, though affected by many factors. A single dimensional measure to evaluate national success is also discussed (Section 4) that incorporates both the happiness element and the sustainability element.

The various improvements and different measures of many aspects related to well being proposed by the Sarkozy Report will certainly be very useful. However, we still need an overall national success indicator to supplement/replace the traditional focus on GDP. As an ultimate indicator, it has to be happiness-based. However, current measures of happiness are not very comparable. Section 3 discusses a method of happiness measure that is comparable interpersonally and internationally/interculturally.

As happiness measures are usually for a certain time period, such as a day or a year, the average lifespan should also be taken into account. The happy nation (or net happy life years

index takes both the average net happiness and average lifespan into account. In addition, since there is the future and there are other nations, a more appropriate national success indicator from a long-term and global perspective is to also take account of the external benefits/costs conferred/imposed on the future and on other nations. These external benefits may include many aspects. To concentrate on the most urgent one, the contribution to environmental quality/disruption, especially in the form of greenhouse gases should be accounted for in the first step. With appropriate measurement to make this comparable with the happy nation index, an environmentally responsible happy nation index (ERHNI) may then be constructed. If politicians and the public pay more attention to such an index, efforts will be directed towards things that are of ultimate value and also on a globally sustainable basis.

2. Happiness Is Universal and Unidimensional

A common mistake is believing that happiness differs between individuals. The truth is that happiness itself is the same universally, in fact not only across different individuals, but also across different species capable of enjoyment and suffering. However, due to differences in individual constitution, experience, culture, education, etc., different individuals may achieve happiness differently and the same factors may affect the happiness of different individuals differently. In fact, even in this respect, individual differences have been exaggerated. As different members of the same species, we share many basic biological similarities, including what make us happy and unhappy. Strictly speaking, it is also a mistake (but certainly a lesser one) to say that happiness is relative. Happiness and unhappiness/pain are absolute. It is just that relative standing, comparisons both to others and to one's own past, and adaptation are very important in affecting happiness, making people misleadingly say 'happiness is relative'.

Why are we [i.e. affectively sentient species] capable of happiness and unhappiness? As I argued in Ng (1996), the evolution of more species made the environment more complex and hence made simple hard-wired behavioural patterns less fitness appropriate. The emergence of subjective consciousness (but no one can explain how is this possible; this 'world-knot' may not be untieable) capable of making a decision such as regarding fight or flight after sizing up the situation on the spot may enhance fitness. However, how did evolution (or God) ensure that the decisions were made in ways actually consistent with fitness? This was solved by endowing conscious species with the capacity for happiness. Choices/activities consistent with fitness like eating nutritious food when hungry and having

sex with healthy and productive members of the opposite sex are rewarded with pleasure and those reducing fitness like injuries are penalized with pain. This principle is true across all affectively sentient species. Thus, happiness itself is universal across all members not only of our own species but across all affectively sentient species.

Of course, different species may be capable of enjoying different amounts and different types of happiness. Obviously, a species not capable of sight cannot enjoy the joy of seeing something beautiful, as a blind person also cannot. Even for the same person, the happiness she enjoys may also be of different amounts or intensities and be of different types. Beautiful sceneries and delicious tastes are different in qualia. However, ignoring the effects on future happiness and that of others, different types of happiness can be compared along a single dimension consisting in the product of average intensity and the duration of enjoyment (or the integral of intensities over the relevant time duration). Just as one may make a mistake in judging the volume of water in containers of different shape, individuals may misjudge the actual amount of happiness; the well-known peak-end heuristic or duration neglect being a notable example. However, this difficulty does not make happiness or water not cardinally measurable uni-dimensionally in principle. In fact, the amount of enjoyment may be expected to be roughly proportionate to the significance to fitness. Hence, pleasure may be used as the 'common currency' (Cabanac 1992).

Ignoring misjudgement (or rather report/recollection), different types of happiness perceived by the individual concerned as being equal are equal. In this sense, different types of pleasure differ only in quantity (as determined by intensity and duration), not in quality. They differ in quality for being of different qualia, as the pleasure of beautiful scenery certainly differs from that of delicious taste. However, they do not differ in quality in the sense of being of higher or lower quality. This is so provided we agree to treat the effects on others and in the future as such.

For example, a certain amount of pleasure from appreciating poetry (or music, reading, etc.) may be regarded as pleasure of a higher quality than the amount from drinking alcohol (or eating cakes). People tend to have such views probably due to one of or both of the following reasons or some similar reasons. First, It may takes more learning to be able to appreciate poetry (compared to alcohol or cakes) and such learning is cumulative; the appreciation now tends to improve one's ability to appreciate poetry in the future. Secondly, the consumption of alcohol or cakes (at least if taken to the excess) tend to produce harmful

effects in the future either on the individual concerned (like gaining weight or harming the liver) or on others (through drunken behaviour or drink-driving). Based on either one or both of these two or similar reasons, it is perfectly sensible to regard the pleasure of appreciating poetry as of higher quality than that of cake eating, or even to encourage the appreciation of poetry. However, for the purpose of measuring happiness of an individual for the current period, it certainly makes sense to concentrate on that individual and on the current period and regard the same amount of pleasure to be of the same amount of significance even if it is of different types. For one thing, the effects on the happiness of others and on the future will be reckoned with when dealing with other individuals and with the future. For another thing, this makes for clarity and steers us away from the confusion of many philosophers for centuries for being unable to see this simple equality.

Taking adequate account of the effects on others and the future also help us resolve the important issue of whether happiness should be in the enjoyment (or 'hedonistic' but this term has been mistakenly attributed a negative connotation) sense of Bentham or in the goodness sense (eudaimon) of Aristotle, as well as whether our ultimate objective should be happiness or life satisfaction, as discussed for centuries by philosophers and happiness researchers. (Raised again recently by Graham 2011, toward the end of paper). In my view, the answer is clear. It is in the enjoyment/suffering sense that happiness/unhappiness has ultimate value or negative value. The element of morality in one's enjoyment is only needed to account for the effects on others and the future. Similarly, life satisfaction could be tainted by the non-affective concern (on which see Ng 2000, App. D) for the happiness of others and hence not a satisfactory index for the ultimate objective, as discussed in more details in Ng (2010).

A specific implication of using the enjoyment/suffering sense of happiness (especially in contrast to using life satisfaction) may be briefly mentioned. It supports the Easterlin paradox (increases in incomes failing to increase happiness after a relatively low income level) the validity of which has recently been questioned. As reported in Graham (2011), Kahneman & Deaton (2010), in a study of 450,000 respondents in a Gallup daily survey of U.S. respondents from 2008-2009, found that hedonic well-being correlated less closely with income than did life satisfaction. Both 'correlated closely with income (in a log-linear manner) at the bottom end of the income ladder, but the correlation between hedonic well being and income tapered off at about \$75,000 per year'.

Just like the universality of happiness, the unidimensionality of happiness also has an evolutionary biological basis. Different activities contribute to or reduce fitness differently. To maximize fitness, they are rewarded/penalized with different amounts of pleasure/pain. Different types of pleasure or pain must also be made one dimensional to facilitate comparisons that help making the right choices and trade-off. Thus, I do not have to be you to know that you (assumed to be a healthy male) would get more pleasure in having a successful sex with a young, beautiful, and healthy (ensuring high reproductiveness) female than in eating a piece of cake, especially when you are not hungry. This also has implications for the cardinal measurability and interpersonal comparability of happiness, to the consideration of which we now turn.

3. Happiness is Cardinal Measurable and Interpersonally Comparable

For certain economic problems like the derivation of demand curves/functions, we only have to assume that a consumer/individual can compare the desirability of different bundles of goods ordinally. The same demand function can be derived from the same set of indifference curves with different sets of cardinal utility numbers. Thus, in this sense, cardinal utility can be assumed away on the ground of Occam's razor for such problems. However, to insist on ordinal utility only (denying the use of cardinal utility) even for other problems (such as social choice, optimal population, choices affecting the probabilities of survival; see Ng, forthcoming on the latter issue) where cardinal utilities are needed, is to commit the fallacy of misplaced abstraction.

Selected almost at random, the following is representative of the modern textbook hostility against the cardinal measurability and interpersonal comparability of utility. 'There is no way that you or I can measure the amount of utility that a consumer might be able to obtain from a particular good... there can be no accurate scientific assessment of the utility that someone might receive by consuming a frozen dinner or a movie relative to the utility that another person might receive from that same good... Today no one really believes that we can actually measure utils' (Miller 1994, pp. 418, 419). There is at least one counter-example to this confident assertion - the present writer.

Another textbook example on the hostility against cardinal utility: 'But how do we tell if a person likes one bundle twice as much as another? How could you even tell if *you* like one bundle twice as much as another? One could propose various definitions for this kind of assignment: I like one bundle twice as much as another if I am willing to run twice as far to

get it, or to wait twice as long, or to gamble for it at twice the odds... Although each of them is a possible interpretation of what it means to want one thing twice as much as another, none of them appears to be an especially compelling interpretation' (Varian, 1993, pp. 57-8). [Citations to be updated.]

Indeed, there **is** an especially compelling interpretation. Since our ultimate objective is happiness (on which see Ng 1990, 1999, 2008a), using the amount of happiness of the individual involved provides a perfect answer to Varian's question, if we ignore the effects on others, which is another issue.

Consider the following three simple alternatives:

A: Your current situation.

B: Your current situation plus being bitten by an ant once.

C: Your current situation plus being thrown bodily into a pool of boiling water.

Obviously, you prefer A to B and B to C. If preference/utility is purely ordinal, this is all you can say. However, even I, not being you, know that the intensity of your preference of B over C is at least many thousand times larger than that of A over B. Moreover, I am also confident that the intensity of your preference of B over C is at least many thousand times larger than that of **my** preference of A over B (interpreting A and B as applied to myself).

True, this is interpersonal comparison of utility regarded by Robbins (1932, 1938) as unscientific. In fact, this comparison of mine is solidly based on evolutionary biology. An ant bite reduces my (and most individuals') fitness by a very small amount and hence induces only a small amount of pain. Being thrown bodily into boiling water threatens ones' survival and must cause great pain and intense attempt to avoid it. Though there may be some degree of interpersonal differences, these are almost certainly less significant than the huge difference between an ant bite and being thrown into boiling water. Thus, our degree of confidence in the truth of my comparison above is no less than 99.99%, a degree envied by all empirical scientists, economists included.

Most people now know that our brain consists of two hemispheres, with the left brain controlling the right side of the body and vice versa. We do not feel this duality as our two brain hemispheres are connected by corpus callosum, making our subjective consciousness unified. However, some patients with serious epilepsy have their two brain hemispheres separated by cutting the connection (to reduce brain interaction). They then behave as if having two centres of consciousness or mind, with their left brain (normally controlling speech) not knowing what their right brain has seen with the left eye, if a blinder is also placed between their two eyes (Gazzaniga 1970). Thus, two separate brain hemispheres each

with independent consciousness may be unified with connection through the corpus callosum. Similarly, if our technology is advanced enough to imitate the connection through the corpus callosum, we could so connect my brain with yours. Then, I could feel your taste of ice cream and you could feel my taste of blueberries. Interpersonal comparison would become almost perfect!

Even before we achieve this high level of neuro-technology, some interpersonal comparisons of utility are possible, beyond deductions based on evolutionary biology discussed above. I managed to devise an interpersonally/intertemporally/interculturally comparable measure of happiness and actually use it to measure self-reported happiness levels (Ng 1996). This is based on Edgeworth's concept of a just perceivable increment of happiness, but developed to be operational and actually used to conduct an actual survey or measurement.¹ Edgeworth took it as axiomatic, or, in his words 'a first principle incapable of proof', that the 'minimum sensible' or the just perceivable increments of pleasures for all persons, are equatable (Edgeworth, 1881, pp. 7ff., pp. 60 ff.). I derived this result as well as the utilitarian social welfare function (SWF), that social welfare is the unweighted sum of individual utilities/welfares, from more basic axioms (Ng 1975). The main axiom is the **Weak Majority Preference Criterion (WMP)**: *For any two alternatives x and y , if no individual prefers y to x , and (1) if I , the number of individuals, is even, at least $I/2$ individuals prefer x to y ; (2) if I is odd, at least $(I - 1)/2$ individuals prefer x to y and at least another individual's utility level is not lower in x than in y , then social welfare is higher in x than in y .*

The reason why WMP leads us to the utilitarian SWF may be explained briefly. The criterion WMP requires that utility differences sufficient to give rise to preferences of half of the population must be regarded as socially more significant than utility differences not sufficient to give rise to preferences (or dispreferences) of another half. Since any group of individuals comprising 50 per cent of the population is an acceptable half, this effectively makes a just perceivable increment of utility of any individual an interpersonally equatable (in its effect on social welfare) and hence comparable unit.

¹ The concept of using the faintest unit of pleasure as the unit of measurement may be traced back to Bentham; see Tännsjö (1998). On Edgeworth's hedonimeter and the quest to measure cardinal utility, see also Colander (2007).

The compelling criterion of WMP makes a just perceivable increment of preference (or pleasure) interpersonally equatable not only at the individual but also at the social level. Thus, if happiness studies use this just perceivable increment of happiness as the unit of measurement (as done in Ng 1996), the resulting measures or values will be interpersonally/intertemporally/interculturally comparable and this will help to solve all problems of comparability (at least at the conceptual level, though practical difficulties will remain). Of course there are other ways to improve the reliability and comparability of happiness measures that have been discussed or remain to be explored. In particular, the moment-based method proposed by Kahneman 2000 is a particularly promising approach. (See also Ng 2008c.) I am also currently working on a project funded by the Australian Research Council to make the measurement of happiness more accurate and more interpersonally comparable.

4. Environmentally Responsible Happy Nation Index (ERHNI)

Our arguments here that that happiness is universal and unidimensional and is also cardinally measurable and interpersonally comparable, as well as the arguments elsewhere (Ng 1990, 1999, 2008a) that happiness is the only ultimately valuable thing, provide a conceptual basis for having a unidimensional measure of national success based on happiness, as outlined below (based on Ng 2008b).

Obviously, it is highly undesirable to be very happy today and die tomorrow. We want not just a happy life but also a long and happy life. (Long life as such is not desirable; if happiness is negative, the longer the lifespan, the more the suffering.) The concept of happy life years (Veenhoven 1996, 2005) is conceived for this purpose. Conceptually, HLY is just the product of the average happiness index over the lifespan and the length of the lifespan. For example, if the happiness index of an individual is 0.7 (out of a scale of 0 to 1) and she lives for or is expected to live for 80 years, her HLY 56 using Veenhoven's method.

This measure of HLY has the following problem. For a scale of zero to one, the midpoint of 0.5 usually means bare neutrality, with positive happiness roughly offset by negative happiness or pain. What is of value is net happiness. To see the point more concretely, consider the following two alternatives.

- A. An happiness index of 0.4 and a long live of 200 years, giving an index of happy life years of 80.
- B. An average happiness index of 0.8 and a lifespan of 80, giving an HLY index of 64.

Since 0.4 is below the neutrality point of 0.5, situation A actually involves an unhappy life. For an unhappy life, the longer the lifespan, the longer the suffering and the worse is such a life. Most people would definitely and strongly prefer B over A despite the higher HLY value of A. Thus, only the net values above the neutrality midpoint should be counted. For this net HLY, the value for A is minus 20, being $(0.4 - 0.5)$ times 200, while that for B is plus 24, being $(0.8 - 0.5)$ times 80. This reflects the desirability of B over A correctly.

For an individual, the net HLY is the correct index. However, for a nation, even the average net HLY (or the 'happy nation index') is not an adequate national success indicator. This is so because the possible effects on people of other nations and in the future have also to be taken into account. These external and future effects may include many forms. However, as mankind is facing the danger of extinction from possible excessive global warming, short of starting a war, the most important form of external costs a nation may impose on others and on its own people in the future is probably that of environmental disruption, including the emission of greenhouse gases. Thus as a first step in a new national success indicator, I propose the use of the environmentally responsible happy nation index (ERHNI), defined by

$$\text{ERHNI} = \text{net HLY} - \text{per capita environmental costs.}$$

The per capita environmental costs are the total global environmental costs (focussed mainly on greenhouse gases at the first instance) imposed by the nation involved divided by its population size. However, these costs have to be calculated in units comparable with the net HLY to make ERHNI sensible. With careful estimates, this could be done, as shown in Ng (2008b). However, this estimate is based on existing measures of happiness which are not strictly speaking interpersonally comparable. A current research of mine (funded by the Australian Research Council) is to measure ERHNI based on more reliable (including the more truly cardinal indices) and more interpersonally comparable methods of happiness measurement. As mentioned earlier, I developed one method in Ng (1996). The current research aims to make this complicated method simpler and widely usable. Hopefully, the success in this ambition may provide a more reliable measure of ERHNI for nations around the world than reported in Ng (2008b).

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