

INTERPERSONAL RELATIONS AND GROUP PROCESSES

Rising Income and the Subjective Well-Being of Nations

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We explored whether rising income in nations is associated with increasing subjective well-being (SWB), with several advances over earlier work. Our methods are improved in that across time, the same well-being questions were asked in the same order, and we employed broad and equivalent representative samples over time from a large number of nations. We also assessed psychosocial factors that might mediate the relation of income and SWB. We found that changes in household income were associated with concomitant changes in life evaluations, positive feelings, and negative feelings. The effects of gross domestic product (GDP) change were weaker and significant only for life evaluations, perhaps because GDP was a less certain index of the standard of living of the average household. The association of income and SWB is more likely to occur when the average person's material welfare accompanies rising income, when people become more satisfied with their finances, and when people become more optimistic about their futures. People did not adapt to the income rises during the period of years we studied, in that income rises produced SWB increases that did not return to earlier levels. It appears that previous researchers failed to come to agreement because of the small sample sizes of the nations, the inconsistent methods across years and surveys, and the lack of measures of potential mediating variables. Analyses of income relative to people in one's nation and between-nation slopes together suggest that income standards are now largely global, with little effect of national social comparison.

Keywords: happiness, subjective well-being, positive affect, income, money

A very important question in the behavioral and social sciences is whether rising incomes produce a better society. Most societies are now working toward material prosperity, and producing higher incomes is the activity that occupies most of the time and energy of individuals and governments. Individuals spend more time working than in any other waking activity, and governments highly emphasize economic growth. Thus, the issue of whether economic growth will improve people's subjective well-being is of both theoretical and applied import.

Critics have expressed doubts about economic progress in terms of environmental degradation it might cause, as well as the detrimental influence materialism might exert on social relationships and human values. Richard Easterlin (1974) caused widespread

debate with his suggestion that the economic growth of nations does not produce rising happiness in them. He pointed to the apparent paradox that rich individuals within nations are happier than poor ones but that rising societal incomes do not seem to be associated with rising subjective well-being (SWB). His third observation, that rich and poor nations do not differ in subjective well-being, has been largely disconfirmed (e.g., Diener, Diener, & Diener, 1995; Diener, Ng, Harter, & Arora, 2010), but the question of whether economic growth has been accompanied by rising "happiness" has remained contentious.

Easterlin (1974) postulated that social comparisons within nations were responsible for a hedonic treadmill because people's standards for incomes rise when the income of others in their society rise, and therefore there is no net gain in life satisfaction as average societal incomes increase. However, he suggested that cross-sectionally the richest individuals in each nation would be on average most satisfied and that the poorest would be the least satisfied. The paradox posed by Easterlin continues to be debated, with Easterlin's research supporting the idea (Easterlin, 1974; Easterlin & Sawangfa, 2010), other research not supporting it (Hagerty & Veenhoven, 2003; Inglehart, Foa, Peterson, & Welzel, 2008; Stevenson & Wolfers, 2008; Veenhoven & Hagerty, 2006),

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and yet others finding mixed support (Diener, Kahneman, Tov, & Arora, 2010).

The “Easterlin Paradox” is not only of applied importance but is a theoretically compelling issue as well. What psychological variables might mediate or obscure the association of income and SWB? First, income changes might not result in changes in the actual material situation of the average household. For instance, rising incomes in nations might go to inefficient governments or to the rich. If the rich were to garner most of the gains of rising societal wealth, increasing incomes might result in greater inequality and therefore harm rather than benefit the subjective well-being of the average person. Thus, we hypothesize that increases in income must be associated with increases in the material quality of life of the average citizens of a society in order for increases in SWB to occur.

Another possible reason that income might vary in its association with rising SWB is that people’s material aspirations might also rise, sometimes more quickly than income. If people want and expect more income and material possessions, and therefore require more money to be satisfied, SWB might be flat or even declining despite rising incomes. Graham and Pettinato (2002) found that “frustrated achievers” can become less satisfied even as their incomes rise because their aspirations increase even more quickly than their incomes. Thus, in the current study, we assess respondents’ satisfaction with their standard of living and analyze whether this mediates the income–SWB association.

The third variable we assessed as potentially mediating the income–SWB association is optimism. In spite of rising or declining incomes, people in a country might feel optimistic or pessimistic about the future, including their financial future, and this could influence their levels of life satisfaction. Optimism can be influenced by many factors in addition to income changes, for example expectations about future income and employment, political stability, and gains in human rights. People might experience rising income but nevertheless expect things to worsen in the future. Thus, optimism about the future can reflect factors beyond past changes in income that could influence people’s subjective well-being.

In the analyses of the Easterlin hypothesis, researchers have relied on gross domestic product (GDP) per capita to assess income, but this measure does not directly reflect the material prosperity of the average household. GDP has a number of blind spots and shortcomings (Dasgupta, 1993). Not only can GDP miss barter goods, the black market, and household production, but it does not directly reflect how the average household is faring economically because it gauges the overall economic growth of the entire nation but does not index how this is apportioned. Furthermore, poor nations can find it difficult to devote the resources needed to accurately compute GDP, and more of their economies are likely to be in the barter and grey-market areas. Thus, in our study we assess the changes in income in nations not only by using GDP per capita but also by the mean incomes of households. The measure of household income may provide a measure that more directly reflects the material well-being of average households within nations than does GDP.

We assessed the material standard of living in households by assessing four material goods—two aimed at discriminating prosperity differences in poorer nations (having adequate money for food and for shelter), one aimed at intermediate incomes (owning

a television, which requires electricity in the home), and one discriminating changes in wealthier households (connection to the Internet). Thus, we included two measures of income and an aggregated measure of standard of living to examine the income–relationship in greater depth. A possible mediator of the income–SWB relation that we examine is whether rising incomes actually result in material improvements in the standard of living for the average citizen.

Another important psychological question regarding rising income and subjective well-being is how the income is spent. One possibility regarding rising incomes and SWB is that there could be an association in poorer nations where greater earning power might equate to more people being able to meet their basic needs, for example for food and shelter. However, in wealthier nations, rising incomes might simply result in more luxuries or status goods and therefore not result in increasing SWB. Thus, we examined the income–SWB association in less versus more economically developed nations.

Easterlin (1974) suggested that rising incomes are not associated with rising SWB because people use others in their society to evaluate their own incomes. He hypothesized that as incomes increase, standards for adequate income rise as well. We analyzed this possibility by evaluating the effects on SWB not only of absolute income but also of relative incomes within nations. If Easterlin is correct, income within one’s own reference group ought to influence SWB, whereas absolute income should add little or nothing in predicting changes in SWB beyond relative income.

Finally, we analyzed whether some types of SWB move in line with Easterlin’s paradox, whereas others do not. Kahneman (1999) drew a critical distinction between two forms of SWB—global evaluative judgments and the ongoing momentary experience of feelings of well-being. In recent years, several researchers have described differences in what is associated with life evaluations versus experienced happiness (Diener, Kahneman, et al., 2010; Graham, Chattopadhyay, & Picon, 2010; Howell & Howell, 2008; Inglehart et al., 2008; Kahneman, Schkade, Fischler, Krueger, & Krilla, 2010). It might be that in evaluating their lives, people often take their incomes into account, whereas factors such as social relationships are critical for enjoying life. Thus, we examined the effects of income change on distinct types of subjective well-being, including life evaluations, positive feelings, and negative feelings.

A possible reason for the past disparate findings is that researchers have had to contend with challenging methodological issues. The measures of SWB often have not been identical across years, and therefore differences in scores might be due to changes in wording or to the order of questions in the surveys. Another shortcoming with past research is that the surveys of respondents have not always been based on representative samples of nations but on selected groups such as those in major urban areas that might differ across surveys. Third, there might have been inadequate statistical power to pinpoint effects because small homogeneous groups of nations have sometimes been analyzed. Finally, the entire debate has focused on life evaluations, and the effects of income could potentially be quite different for affect—for positive and negative feelings (Diener, Ng, et al., 2010).

In the Gallup World Poll (GWP) that we used in this study the measures of SWB are administered in a standardized fashion in large numbers of nations over time, with large representative

samples of those nations. Furthermore, it includes measures of possible psychological mediating variables of the income and SWB relation. These variables might mediate the income–SWB association but are also factors that could mask associations if they move in a direction opposite to income during that period of time. Thus, we are in a stronger position than previous researchers to examine the Easterlin debate based on equivalent data over time, as well as assessment of the psychological mechanisms that might underlie the income–SWB association.

Summary of the Goals of the Study

In sum, we first determined whether there is an association between changes in income and changes in several types of SWB, using improved methods such as broad representative samples of a very large number of diverse nations and using identical measurement methods across time. We assessed income in two ways and also measured the material prosperity of households with four possessions covering a range of levels of wealth. Thus, we can with more certainty determine whether material advances raise SWB. Importantly, we assessed the psychological mediators that have usually been omitted in past research. We measured whether optimism and satisfaction with standard of living influence the association between income and SWB. We also analyzed SWB and income in poorer versus richer societies to determine whether income rises benefit SWB when basic needs are at issue, but not beyond that point. Finally, we analyzed relative versus absolute income in association with SWB to examine within-nation social comparison effects.

Method

Samples

For our analysis, we used a subset of data from the 2005 to 2011 Gallup World Poll (GWP) administered to 838,154 individuals from 158 nations. We used countries that have had at least three waves of data collection. Based on this criterion, 135 nations with a total of 806,526 individuals were used for our analyses. There was an average of 1,182 ($SD = 560.6$) participants in each wave per country. Each wave collected within a country was nationally representative of the resident population 15 years of age and older. Both rural and urban areas were covered. Telephone surveys were conducted when telephone coverage in the nation represented at least 80% of the population. In such instances, random digit dialing or a nationally representative list of phone numbers was used to create a representative sample. In countries with high cell phone usage, a dual sampling frame was used.

In many developing nations—including Central and Eastern Europe, Asia, the Middle East, and Africa, a geographical area frame was used for sampling in face-to-face interviews. Primary sampling units were stratified by population size or geography. Random route procedures were then employed to select households. Unless an outright refusal occurred, at least three attempts were made to reach a person in each household, spread over different days and times of days. Within each household, respondents were randomly selected by means of the Kish (1949) grid technique.

The sample analyzed included all the inhabited world regions—Asia, Europe, North America, Central America, South America, South East Asia, the Middle East, and Oceania. Major countries were covered, including those with the largest populations (Central Intelligence Agency, 2009) such as China, India, the USA, Indonesia, Brazil, Pakistan, Bangladesh, Nigeria, Russia, Japan, Mexico, and the Philippines. Only a few nations with large populations, such as North Korea, were omitted due to inaccessibility. Based on country populations of the 135 nations, we estimate that the samples we analyzed were representative of 94% of the world's population (Central Intelligence Agency, 2012).

Measures

Subjective well-being. The cognitive and affective components of SWB were assessed using three measures. First, *life evaluation* was assessed using the Cantril (1966) Self-Anchoring Striving Scale that asks respondents to appraise their present lives. Responses were made on a 0 (*worst possible life*) to 10 (*best possible life*) scale. This measure reflects global evaluations of a respondent's life. Second, *positive feelings* were measured by the extent to which individuals experienced specific positive states (“smile/laugh” and “enjoyment”) much of the previous day (individual-level $\alpha = .61$; country-level $\alpha = .82$). Because the analyses were conducted at the national level, the nation level reliabilities are most relevant. Items were assessed using a dichotomous (yes = 1, no = 0) format. Using the same question and scale format, *negative feelings* were measured using four negative emotion terms (“worry,” “sadness,” “depression,” and “anger”; individual-level $\alpha = .67$; country-level $\alpha = .80$).

Economic indicators. Two income variables were examined in our analyses. *GDP* per capita purchasing power parity was obtained from the International Monetary Fund (2011). Purchasing Power Parity was used because it represents the incomes of nations in terms of equivalent purchasing power and thus controls for differences in cost of living across nations. Aside from GDP per capita, we also examined the Gallup World Poll *household income* measure that was administered during the survey. These scores were subsequently transformed by the Gallup Organization to international dollars calculated from the World Bank purchasing power parities. We averaged the scores within countries to obtain an index of national household income.

Possible mediators. Several possible psychological mediators were examined. These included material goods, optimism, and satisfaction with standard of living. *Material goods* were measured using four dichotomous (yes = 1, no = 0) items: whether individuals had enough money for food, whether they had enough money for shelter, if they owned a television set, and if their household had an Internet connection (individual-level $\alpha = .60$; country-level $\alpha = .85$). *Optimism* was assessed using a single indicator of the Cantril's Self-Anchoring Striving Scale that asked participants to evaluate the quality of their lives 5 years in the future. *Satisfaction with standard of living* was measured using a single dichotomous (yes = 1, no = 0) item that asked if individuals were satisfied with their current standard of living.

Results

Descriptive Statistics

All analyses except those for social comparison are at the nation level. Throughout our analyses, we analyzed income in log 10 units. Log income was used because it has the advantage that equivalent income changes throughout the scale represent equal percentage changes in raw income and thus represent changes as a proportion of existing income consistent with analyses by Easterlin and Sawangfa (2010). Many human perceptual systems are based on log units of external stimuli, and it makes sense that an increase of a certain number of dollars will usually mean more to a poor person than to a wealthy person. Furthermore, log units reflect the declining marginal utility feature of income and also typically yield linear relations with SWB that are consistent with statistical models assuming linearity such as correlations or regression analyses (Cohen & Cohen, 1983).

Table 1 shows the means, standard deviations, *N*s, and high and low scores for nations for the key variables. Table 2 presents the correlations across all nations and waves between the key variables. There were 135 nations and a total of 682 nation-waves.

Differences in Income Measures

Although the correlation between household income and GDP was .916, this does not mean that GDP change and household income change together to the same degree. Also note that although GDP and household income means might be highly correlated at the country level, this does not necessarily mean that GDP is a good indicator of average individual income within a nation because income can be divided quite unevenly, and this differs across nations. When we examined the difference between initial and final GDP, we found that all but four nations had positive growth. However, analysis of household income revealed that 61 nations had negative household income declines. Some prominent nations like the United States had a GDP growth of \$3,843 but average household income declined by \$7,903; Germany had GDP growth of \$6,920 but household income dropped by \$4,684. This discrepancy indicated that GDP growth is not always an accurate index of the average household income change within a nation over a period of several years.

To estimate the percentage of variance accounted for by GDP per capita on household income, we used hierarchical linear modeling (HLM), specifically a random intercept model with a first

order autoregression as appropriate for longitudinal data. This type of analysis is statistically optimal compared to traditional ordinary least squares (OLS) because it accounts for autocorrelations among country waves typically present in time series data (see Raudenbush & Bryk, 2002). Following HLM conventions in specifying predictors across time and predictors between countries, the Level-1 predictor was within-country changes in GDP, where GDP for each year is subtracted from average country GDP over time. The Level-2 predictor was average levels of country GDP over time. In this manner, within-country changes are distinguished from between-country differences in wealth. Average levels of GDP predicted average levels of household income and accounted for 88.9% of the variance. However, we found that GDP growth accounted for only 18.3% of variance in changes in household income. This shows that while GDP per capita is a good proxy for between country differences in household wealth, GDP growth over time is not synonymous with increases in average household incomes, at least over the period of a few years. Therefore, in the analysis of the Easterlin paradox, it is important to distinguish between the two types of income change.

Across Time Associations of Income and SWB

Association over time. We used hierarchical linear modeling to examine the relation between within-country income and SWB over time. A random coefficients model was specified to account for variability in country-level SWB. As with the previous analysis, because measures of income and SWB were repeated over time, a first-order autoregressive model was applied to account for serial correlations between SWB measured on adjacent years. The Level-1 predictor is within-country income over time centered around country income, which effectively removes between-country differences on income. Between-country differences in income are introduced at Level-2 as a predictor instead. The focus of our analysis is on the Level-1 within-country income as we are interested in how income change over time is related to SWB change apart from the effects of between-country income.

The results show that household income predicted all forms of SWB over time. Household income change predicted changes in Life Evaluations ($\beta = 0.70, p < .001, \Delta R^2_{within} = 6.8\%$), Positive Feelings ($\beta = 0.06, p < .01, \Delta R^2_{within} = 2.3\%$), and Negative Feelings ($\beta = -0.05, p < .01, \Delta R^2_{within} = 1.4\%$), with the ΔR^2_{within} representing variance accounted for in SWB over time. However, GDP per capita change predicted only changes in Life Evaluations ($\beta = 1.69, p < .001, \Delta R^2_{within} = 3.2\%$). GDP per capita change did

Table 1
Descriptive Statistic of Key Variables of Nations and Waves

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	Lowest	Highest
Household income (log 10)	600	3.87	0.44	2.65	4.73
GDP per capita (log 10)	668	3.86	0.55	2.57	5.01
Life evaluation (0–10)	676	5.44	1.09	2.81	8.02
Positive feelings (0–1)	676	0.71	0.11	0.40	0.92
Negative feelings (0–1)	674	0.23	0.07	0.08	0.56
Material well-being (4 items, 0 to 100)	679	0.65	0.19	0.16	0.98
Satisfaction with standard of living (0–1)	678	0.60	0.19	0.09	0.95
Optimism for 5 years in future (0–10)	675	6.69	0.89	3.85	8.78

Note. *N* is for the number of nation-wave pairs. GDP = gross domestic product.

Table 2
Correlations of Variables Based on Nation-Wave Means

Variable	Household income	GDP per capita	Life evaluation	Positive feelings	Negative feelings	Material well-being	Satisfaction with standard of living	Optimism
Household income	—							
GDP per capita	.916*	—						
Life evaluation	.778*	.785*	—					
Positive feelings	.260*	.292*	.549*	—				
Negative feelings	-.078	-.038	-.211*	-.436*	—			
Material well-being	.889*	.897*	.774*	.236*	-.056	—		
Satisfaction with standard of living	.621*	.601*	.787*	.592*	-.231*	.648*	—	
Optimism	.334*	.366*	.712*	.550*	-.359*	.327*	.600*	—

Note. GDP = gross domestic product.
* $p < .01$.

not significantly predict changes in Positive Feelings ($\beta = 0.06, ns$) or Negative Feelings ($\beta = -0.05, ns$) although there was a trend in the right direction. The coefficients reported are not standardized coefficients as is the convention in HLM analyses because Life Evaluation is on a 0–10 scale, whereas Positive and Negative Feelings are on a 0–1 scale. Therefore, the magnitude of effects for household income is actually quite similar for the three forms of SWB. Although the magnitude of the coefficients for GDP per capita and household income are similar for feelings, the standard errors for GDP per capita are substantially larger (0.05 versus 0.02), indicating that GDP has a more inconsistent relationship with affective well-being.

Strength of relationship over time. One question that is pertinent to the Easterlin paradox is whether the significant income effects that were found are attenuated over time. To examine this we used the previous analytic model and additionally included the main effect of the variable time (coded so that Year 2005 = 0, Year 2006 = 1, . . . , and Year 2011 = 6) and the interaction between time and country income fluctuations at Level-1. This interaction term signifies the moderating effect of time on the association between income fluctuations and SWB. If within-country income changes are attenuated over time, then the interaction effect should be significant. The relationship between GDP

per capita and Life Evaluations was not moderated by time ($\beta = 0.023, ns$). Similarly, the relationships between household income and the different dimensions of SWB did not attenuate over time ($\beta_{\text{evaluations}} = 0.207, \beta_{\text{positive}} = -0.005, \beta_{\text{negative}} = 0.023, \text{all } ns$). Thus, income rises did not cause a peak that thereafter returned to baseline but instead raised SWB permanently across the years we studied.

Directionality of influence. Given that we found a robust temporal association between income and life satisfaction over time, and this effect held over time and across types of income, we seek to examine whether we could establish a causal interpretation of income enhancing life satisfaction. In analytic terms, does initial country income predict future life satisfaction, controlling for initial life satisfaction? This is akin to establishing causality in medical science via longitudinal prospective studies in cases where experimentation is difficult. To this end, we conducted cross-lag analyses, in which the effect of the previous year’s life satisfaction on the next year’s income, not just the effect of previous year’s income on the next year’s life satisfaction, was simultaneously estimated. Specifically, Time t life satisfaction was predicted from both Time $t - 1$ life satisfaction and Time $t - 1$ income as shown in Figure 1. We used Mplus 4.20 to conduct a series of cross-lag analysis. We fixed the effect of Time $t - 1$ income on Time t life

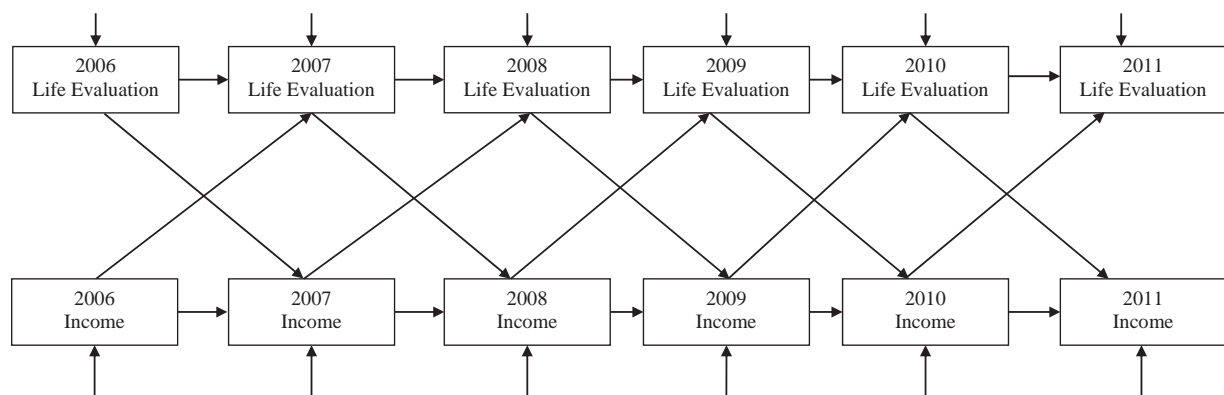


Figure 1. Cross-lag analysis on life evaluation and income. The cross-lag effect from Time $t - 1$ Income to Time t Life Evaluation was fixed to be the same across the 5 years. Likewise, the cross-lag effect from Time $t - 1$ Life Evaluation to Time t Income was fixed to be the same across the 5 years. In addition, autoregression coefficients were fixed to be the same across the 5 years.

satisfaction to be constant across the five cross-lags. Similarly, we fixed the effect of Time $t - 1$ life satisfaction on Time t income to be constant across the five cross-lags. We did not allow for the association of error variance for any indicators (or observed variables).

The cross-lag analysis on household income and Life Evaluation showed reasonable model-fit, $\chi^2(60) = 170.12$, $CFI = .959$, $TLI = .955$, standardized root-mean-square residual [SRMR] = .080. On average, the previous year's income had a significant positive effect on the next year's Life Evaluation ($\beta = .09$, $p < .01$), above and beyond the previous year's Life Evaluation. The previous year's Life Evaluation was also positively associated with the following year's mean income ($\beta = .04$, $p < .01$), above and beyond the previous year's mean income. The cross-lag model on GDP and life evaluation fit the data well, $\chi^2(60) = 195.07$, $p < .01$, $CFI = .972$, $TLI = .969$, $SRMR = .050$. Previous year GDP predicted the next year's life evaluation ($\beta = .09$, $p < .01$), but previous year's Life Evaluation did not predict the following year's GDP ($\beta = -.002$, *ns*).

Overall, the cross-lag analyses showed that present household income affects future Life Evaluations and vice versa and that present GDP per capita affects future Life Evaluations, but not the other way around. This demonstrates that present country income measured in both forms consistently predicts future Life Evaluations. This suggests the presence of a causal relationship of income producing Life Evaluations over time.

Mediators of Income's Effects

If the relation between income and SWB is significant over time, but there are many nations that are exceptions to this general pattern, do psychological variables provide a prediction of when income and SWB will move together? We asked two questions relative to three potential mediating variables. First, do they reduce the association between changing income and changing SWB when their effects are controlled, thus providing insight into when SWB and income move together or in opposite directions? Second, do they add to the prediction of SWB beyond the effects of income, suggesting that they can change independently of income and in so doing have an effect on SWB that is not related to income changes? Thus, we examined the third variables both as mediators and as confounding third variables that could cover the income-SWB associations, even though we label them only as "mediator" variables. The following analyses are based on change scores

between each year and the following wave of data across all country-waves.

We focused on household income because it has a more robust association with changes in material standard of living and with SWB. As predicted, changes in household income were correlated significantly with changes in household material well-being ($r = .23$, $p < .01$), satisfaction with standard of living ($r = .13$, $p < .01$), and optimism ($r = .11$, $p < .05$).

When the mediators were controlled, the effects of income change added little to the variance explained in life evaluations, although it was significant (.1%, $p < .05$), indicating that the association between changes in household income and changes in life evaluation were largely mediated by changes in material well-being, satisfaction with standard of living, and optimism. We directly tested mediation using path analysis, which produced parallel results. The total indirect effects of income via the three mediators was significant ($\beta = .13$, $p < .001$), with significant specific indirect effects for material well-being ($\beta = .02$, $p < .05$), standard of living satisfaction ($\beta = .02$, $p < .05$), and optimism ($\beta = .08$, $p < .01$). The path model showed that after including the mediators, the effect of income on life evaluations was not significant ($\beta = .04$, *ns*).

Taken together the analyses reveal that the effects of income on SWB are mediated by material conditions and optimism, and this accounts for the majority of effects on changes in SWB. Thus, whether increasing income leads to increasing life evaluations strongly depends on whether people's material conditions are actually improving and whether they are optimistic about their futures. In addition, these variables changed to some extent independently of income and predicted SWB, even with income controlled, indicating that they can obscure the effects of income changes on SWB.

As shown in Table 3, among the nations that rose on average household income (final country wave minus initial country wave), 64% of nations rose on Life Evaluations. Importantly, when income increases were combined with increases in material goods, standard of living satisfaction, and optimism, the percentage of countries that increased on Life Evaluations was 95%. However, decreases in all factors made it highly unlikely that countries increased on Life Evaluations—only 10% of nations showed increases.

In other words, there were rising life evaluations in 23% more of the nations when incomes rose versus declined over time.

Table 3
Societal Conditions That Improve SWB

Type of subjective well-being	Societal factor(s)	Combination of societal factors			
		Income	Income & material goods	Income, material goods, & standard of living	Income, material goods, standard of living, & optimism
Life evaluations	Increase %	64	67	82	95
	Decrease %	41	48	33	10
Positive feelings	Increase %	61	58	74	65
	Decrease %	48	48	40	40
Negative feelings	Increase %	50	53	41	35
	Decrease %	69	70	87	80

Note. Percentages indicate the percentage of countries that increase on life evaluations, positive feelings, or negative feelings, depending on whether various combinations of societal factors increase or decrease. SWB = subjective well-being.

However, when the three mediators also changed in the same direction, this difference was magnified to 85%. In other words, 85% more of the time there was an increase in life satisfaction when nations rose on income and the mediators compared to nations that declined on all four factors. When the mediators and income all move in the same direction then life evaluations are very likely to follow. Thus, the mediators helped very substantially in predicting when nations would rise or fall in life evaluations.

There were similar trends for positive and negative feelings, although the trend for Positive Feelings was weaker. For countries that showed increases in all of the societal factors, a majority of them, 65%, showed Positive Feeling increases, compared to 40% for those showing decreases in all factors. Increases in societal factors over time were also associated with a lower proportion of countries having increases in Negative Feelings (30%), and decreases in societal factors meant that more countries showed stronger Negative Feelings increases (80%).

Poorer Versus Wealthier Nations

We divided nations into two categories—richer and poorer groups—to test whether the strength of association between economic growth and the SWB of nations was greater in poorer nations than was in wealthier nations. Poorer nations were defined as those who during the period of the study had average per capita incomes of \$10,000 or less in USA dollars, and the richer nations were those who had average incomes at or above \$10,000. We found that the associations between within-country income changes and Life Evaluations changes were not significantly different between richer and poorer nations (GDP per capita, $r = .19$ versus $r = .23$; Household income, $r = .26$ versus $r = .28$). This finding was also confirmed via an extension of our initial HLM analyses of income predicting SWB. We examined whether country wealth (i.e., average country income across time) interacted with within-country changes in income to predict SWB. Both measures of income failed to show a significant moderation effect of country wealth. Thus, we found no support for the idea that income change will produce SWB change primarily in poor nations. In addition, we examined our models including curvilinear effects, but these effects were quite weak and almost always nonsignificant.^{1,2}

Social Comparison Within Nations

We examined standardized household income across nations and within nations to compare the extent to which absolute or relative income contributes to Life Evaluations, respectively. These analyses were conducted on individual respondents, not nations. Because of the large sample size of about 800,000 individuals, relative income significantly predicted Life Evaluations ($\beta = .01, p < .001$) beyond absolute income ($\beta = .42, p < .001$) but added virtually zero incremental variance. Consistent with the regression results, zero-order correlations indicate that the association of relative income and Life Evaluations is slightly positive when raw income is not controlled ($r_s = .02, p < .001$), although much weaker than the association of raw income with Life Evaluations ($r = .42, p < .001$). Thus, there is no evidence here that income relative to others in one's country is a key determinant of global Life Evaluations beyond one's absolute income. Indeed, the analyses indicate that absolute income effects are strong.

Social comparison effects can also be examined by analyzing the slopes between income and SWB within nations and comparing those slopes with the slope between mean income and mean SWB across nations. If Easterlin's analysis is correct, the slope should be small or nonexistent across nations. At the very least, the slope ought to be much steeper within nations than between them. In fact, we found the opposite, with the mean average slope within nations being 1.44 between household income and life evaluations, while the slope between nations was 1.95. This was consistent with HLM using random intercepts and slopes ($ps < .001$), where the within-country income effect was ($\beta = 1.44, p < .001$) smaller than the between-country income effect ($\gamma = 2.01, p < .001$). Aside from the income main effects, between-country income also significantly moderated the slope of within-country income and Life Evaluations ($p < .001$), with richer nations having slightly steeper slopes than poorer countries as shown in Figure 2.

This shows that country wealth enhances the effect of individual wealth on SWB. From Figure 2, we see that a rich person in a rich nation would be better off than a rich person in a poor country, possibly because of the superior infrastructure, such as good roads, excellent hospitals, good schools, and so forth, which is often absent in poor societies. Conversely, it might be more desirable to be a poor person in a rich nation than in a poor one because of the likelihood of social safety nets. Thus, nation income effects might be stronger than the individual effects because individuals profit not only from their average higher personal incomes but also benefit from the advantages of living in a wealthier nation.

Discussion

There were several major findings from this study:

1. Household income increases were associated with increases in life evaluations and positive feelings and with lower negative feelings.
2. GDP per capita did not strongly correspond to changing household incomes over time and tended to show weaker associations with subjective well-being. Changes in it were associated with changes in life evaluations but not in feelings. GDP's association with life evaluation was weaker than that for household income.
3. Life evaluation was not only associated with income but was influenced by changes in income. Across time, both

¹ We examined this by additionally including the squared term for within-country income over time as a Level-1 predictor in our HLM model. This effect was not found to be significant for all forms of SWB using log transformed GDP per capita or household income as a predictor. Similarly, the curvilinear effect was not significant for raw GDP per capita or household income on SWB. There was only one exception where the curvilinear effect was significant for raw GDP per capita on Life Evaluations. A negative curvilinear effect ($\beta = -0.0008, p < .05, \Delta R^2_{within} = 0.0\%$) revealed that larger income changes were associated with smaller increases in SWB, but this did not increase the variance accounted for beyond the linear effect.

² We also examined raw income without using a log transformation in our HLM analysis. Both household income and GDP per capita predicted life evaluations over time, but neither predicted feelings.

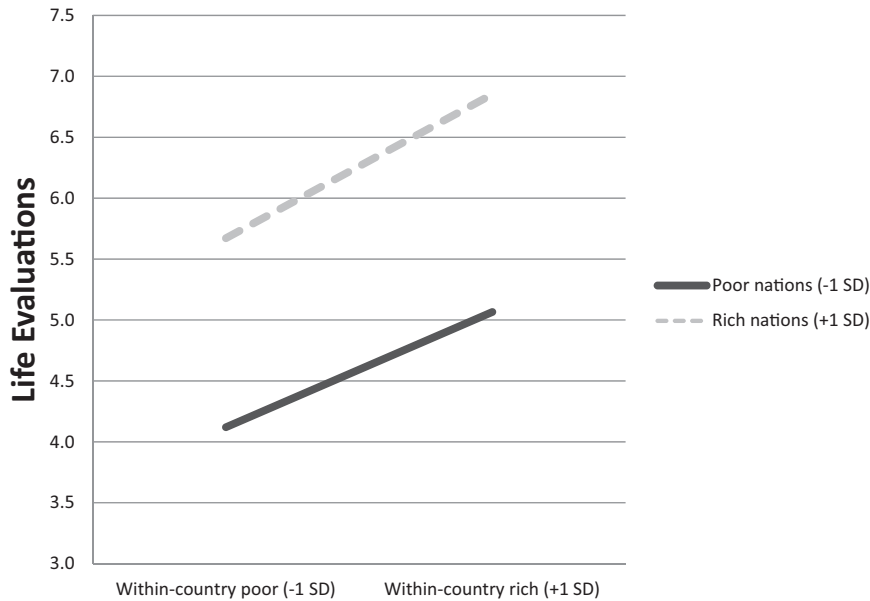


Figure 2. Within and between country comparisons.

measures of income predicted future life evaluation beyond previous life evaluation.

4. Three factors—increasing material possessions, financial satisfaction, and optimism—mediated the association of income and SWB. In addition, each of the mediators predicted life evaluations above and beyond income changes. Thus, rising income primarily leads to changes in SWB if it leads to more individual purchasing power, optimism, and financial satisfaction.
5. The effects of income comparison within a person's own nation did not predict SWB beyond the absolute effects of income. Furthermore, there was a steep and linear relation of income and SWB across the nations of the world. Taken together, these facts suggest a worldwide standard for income.
6. We found virtually no curvilinear effects of income on well-being, and rising income had about the same effects on SWB in poor and wealthy nations.
7. The effects of income on SWB did not cause a temporary rise in SWB but led to changes that endured over the period of the study.

What can we learn about the Easterlin debate from these findings? Does rising income lead to rising SWB? We found that rising household income is significantly associated with all three forms of subjective well-being. GDP per capita is a less than optimal measure of household income, but rises in it are associated with significant rises in life evaluations. The most consistent result is that income is associated with life evaluations over time. Our findings point to several likely suspects in why Easterlin failed to find effects of rising income on SWB.

One reason that Easterlin might have failed to find an income effect on SWB was that he relied solely on GDP, which is an indirect indicator of the material well-being of the average household. Indeed, we found that GDP per capita growth over a period of a few years does not reliably translate to increases in household income. Although household income and GDP per capita were highly correlated cross-sectionally, GDP per capita change accounted for only about 18% of the variance in household income change. Thus, GDP per capita is not sensitive enough over a short period to reflect changes in household standards of living.

Another reason that Easterlin likely did not uncover effects is that although across a very large and representative sampling of nations there is an income effect on SWB, there were many nations that did not show this pattern. Thus, it is also possible that Easterlin failed to find effects because he used relatively small numbers of nations or homogeneous sets of nations. We could point to nations where income and SWB did not move together and others where they did. If rising incomes sometimes but not always produce rising subjective well-being, why is this so? We found that changes in optimism partially mediate income's effects, but optimism also has an effect beyond income. Thus, changes in the optimism of nations that do not result from increasing income can move life satisfaction in a different direction from income changes. The same is true of satisfaction with standard of living.

Finally, rises in GDP must result in a higher standard of living for the average citizen and not just wealthy individuals for income to influence SWB. In the long run, GDP growth probably results in a rising standard of living for most people, but the effects of income growth may have less effect on SWB if they are divided quite unequally in the society. Finally, we found weaker effects of income on feelings than on life evaluations, and this makes it plausible that findings for "Happiness" measures, which have sometimes been used in the Easterlin debate, are less responsive to income changes than purer life evaluation measures.

We discovered that people did not adapt to income increases during the period of 7 years that we studied. That is, people did not react positively to income increases but then in ensuing years drop back to their former levels of SWB. The fact that higher levels of SWB were sustained is important because it suggests that people are not necessarily on a hedonic treadmill when it comes to income. However, local social comparison or a world standard, not one's past income, might be the most relevant standard by which people judge their incomes, and these could lead to a treadmill that does not result from over-time adaptation.

We found that social comparison within one's nation was not a primary determinant of SWB (see however, Luttmer, 2005). On the other hand, it may be that a global standard of income now exists because nations across the globe show a linear pattern of SWB and income, and the addition of relative income within nations and income groups added only a small amount to the prediction of life evaluations.

Beccetti, Castriota, and Giachin (2010) suggested that people now compare against a global standard of income set by the richest nations rather than only relying on people immediately around them. Beccetti et al. found that people's life satisfaction depends on their monetary distance from the richest nations. Thus, nations can become less happy even if they grow in income if they fall further behind the richest countries. The authors suggested that the richest nations set the standard for desirable income, and this might be a relatively recent occurrence due to the ubiquity of television and other global media. An alternative explanation for the worldwide standard is that income is largely spent on things such as food, shelter, health, and goods than are inherently evaluable (Hsee & Zhang, 2010) rather than purely comparative. An important task for future research is to examine these two explanations because their implications are profound and quite different in terms of the effects of world economic growth.

We examined raw or absolute income as well as log income. Our primary focus was on log income for several reasons. First, this is what Easterlin used and what has been employed throughout the Easterlin debate. Second, log income has the advantage of tending to be more consistent with statistical assumptions as it produces more normal distributions of income. Third, log income results in changes being of equal percentages throughout the scale and thus takes into account the declining marginal utility of money. Log income reflects the idea that it is likely to take greater amounts of money to make a difference to a wealthy person versus a poor person. However, one can also make arguments in favor of using raw income, such as the fact that specific items cost essentially the same amount regardless of one's income. Thus, we analyzed raw income and found that both types of raw income were associated with life evaluations but not feelings. Thus, these results mirrored the general log income findings in suggesting that income influences life evaluations but has weaker effects on feelings.

An important avenue for future research is to determine why rising incomes have weak effects on positive feelings such as enjoying life. One would imagine that enjoyable activities such as fine food, travel, and better health, as well as comforts such as more reliable heating and cooling, might raise the enjoyment of life. One possible reason that income might in general not produce higher enjoyment of life is that income-producing work is less enjoyable than social leisure (Kahneman, Kruger, Schkade,

Schwartz, & Stone, 2004). Kahneman et al. (2004) found that higher income women enjoyed both work and leisure more than poorer women. However, because richer women worked longer hours, and work was on average less enjoyable than leisure, the benefits of income were largely canceled. Social factors such as trust and lack of corruption might be the primary causes of positive feelings and explain why they did not change with income as reliably as did life evaluations. However, it is also possible that less reliable measures of feelings or stronger homeostatic forces for feelings are the reason that they did not change as reliably with income in this study. Thus, the relation of income change and changes in feelings is a very important avenue for future research.

There are other factors that may affect the association of income and SWB. For example, Clark (2010) found that self-employment is associated with higher life satisfaction but is declining in economically developed nations. Furthermore, rising incomes should not result from foregoing quality social relationships because in this case enjoying life might likely decrease despite rising incomes. In retrospect, it was perhaps naïve for scientists to expect that there would be an automatic input-output association between income and SWB. The relation between income and SWB probably does reflect to some extent the objective state of affairs, but psychological variables such as aspirations, expectations about the future, how people earn income, and how people spend their time and incomes (Dunn, Aknin, & Norton, 2008; Dunn, Gilbert, & Wilson, 2011) are likely to be critically important as well.

An important caveat in interpreting our findings is that our study examined relatively short-term changes in income over a period of several years, not changes over decades. Larger changes in incomes than we were able to observe, including over longer periods of time where adaptation to them would be more common, might show different patterns of association with SWB. However, in such examinations over long periods of time it will be critically important to have representative sampling in large numbers of nations and identical measures that are presented in the same order over the years.

Take Home Message

We found a significant relation between changes in household incomes of nations and their changing SWB over time. Changes in GDP per capita predicted changes in life evaluations but not positive and negative feelings. Although these trends were significant, there were nations where rising income was not associated with rising SWB. Our findings indicate that for rising income to be most likely to influence SWB it must lead to greater optimism, financial satisfaction, and household material prosperity. In the cases where these factors move in the opposite direction from income, they can mask the effects of income on SWB. Thus, where optimism about the future is low, or aspirations for income are rising very quickly, higher incomes may not be associated with higher SWB. Because a worldwide standard for income seems to exist, a very important question for future research is to determine whether this is due to worldwide comparisons or to the fact that people desire universally evaluable goods and services. Finally, we did not find adaptation to changing income levels, although our examination is confined to periods of 7 years or fewer.

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