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Does Happiness Pay Revisited – New Evidence from the U.S.A.

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Introduction

The study of subjective well-being in economics began as a nascent collaboration among a small group of psychologists and economists (including one of us) about twenty years ago. It has since gone from the fringes of economics to the mainstream, and governments around the world (including the UK) routinely include the metrics as complements to the income and production based data in GDP in national statistics collection. The approach, an outgrowth of behavioral economics, directly inserts human beings – and their (at times irrational) decision-making – back into economics.

While vocal skeptics remain, the approach has succeeded in combining the large N econometric tools of economists with the kinds of survey questions asked by psychologists as a means to provide new insights into how and why people evaluate their lives positively or negatively, as well as the determinants of their daily quality of life. These insights often depart from what standard income based metrics reveal, and demonstrate that homo sapiens (unlike traditional homo economicus) tends to value things such as equity, altruism, friendship, and good health as much if not more than income. The approach can also demonstrate the well-being or ill-being effects of choices that are not the result of revealed optimal preferences, but instead stem from addiction or self-control problems, and/or lack of choice that is due to strong normative arrangements, such as discrimination.

Research methods have become more sophisticated over time, and have extended beyond simple survey research to experiments, randomized control trials, and even studies of genes and other biological traits (see literature review below). Most of the research has focused on the determinants of happiness and well-being more generally, providing a broad base of evidence of consistent patterns in these determinants in the daily experience and life course evaluations of individuals all over the world and across time. A smaller body of research, though, has asked an analogous but more difficult question: what does happiness cause? Do happier people do better in the future? In what arenas? What are the channels driving these outcomes?

One of us (Graham, with Eggers and Sukhtankar, 2004) wrote one of the first papers in economics to address this question. Using over time data for Russia from 1995-2000, we isolated each individual's unexplained or residual happiness – e.g. what was not explained by the usual socio-economic and demographic variables – in a first-stage regression, and then used that as an independent variable in a second stage regression, with second period income, health, and social outcomes as (respective) dependent variables.

We found a strong positive association suggesting causality running from happiness to future outcomes and published the paper. Yet the initial reaction to the paper was dismissive at best. The two main criticisms were that respondents in period one were simply able to predict their outcomes in period two, which would explain why they were happier ex ante. There was also skepticism about data from a

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Russian sample in the unstable time of 1995-2000. There were indeed a number of uncertainties during that period, but they made it quite *unlikely* that most respondents could predict their future incomes.

Several years later, several other economists, based on experiments (Oswald, Proto, and Sgroi, 2015) and twin studies (DeNeve and Oswald, 2012) showed that happier and/or more optimistic people had better future outcomes. DeNeve and colleagues (2013) subsequently reviewed a wide range of associations between higher levels of happiness and better outcomes in the health, labor market, and risky behavior arenas, and there is now far less skepticism about those associations being robust than there was when we published our findings over a decade ago.

In this paper, we revisit our initial approach in the Russia study, and take advantage of a new Gallup panel for the U.S. for 2014-2016. We essentially duplicate our original method, and add some new specifications. We find remarkably similar patterns and associations between initial period happiness and later period outcomes in the U.S., based on a very different time and sample from Russia in the 1990's.

We believe that duplicating the earlier findings in a very different time and place is an important test of how robust this association is. We also find some new twists in the initial patterns that are interesting in their own right. The aim here is not only to show that the causality does not just run from the usual variables to higher or lower levels of well-being, but that the traits that subjective well-being metrics capture, such as happiness and hope, have their own independent role in the outcomes of the lives of myriad individuals around the world.

Before proceeding to our methods, data, and results, we provide a brief review of the extant literature in this nascent area.

Literature Review

In recent years, consensus has developed among scholars on the need to make distinctions between two distinct dimensions of well-being: hedonic and evaluative (Stone and Mackie, 2013). Hedonic or experienced well-being assesses respondents' affective states – positive or negative, smiling or stressed, for example, as they experience their daily lives. Evaluative metrics, meanwhile, assess respondents' satisfaction with their lives as a whole, including the whole life course. Hedonic metrics correlate far less closely with income than do evaluative metrics, as after a certain amount of income, more money will not make you smile or enjoy time with your friends more (Kahneman and Deaton, 2010). In contrast, respondents with more means are more likely to be able to anticipate and/or reflect upon a life in which they have had choices, and, as such, typically score higher on evaluative measures.

Meanwhile, a modest but growing body of research finds that higher levels of evaluative well-being lead to investments in the future and in better future outcomes, as in the labor market and health arenas. We briefly review that literature with a particular focus on the linkages between well-being (in its distinct dimensions), positive attitudes about the future, and behavioral outcomes in the health, income, and social arenas.

These linkages are not simple to establish and prove empirically. There is a shortage of data following the same people over time, which is what we need to compare initial levels of well-being with later outcomes, holding all other factors constant. In addition, the causal channels in these linkages entail a mix of objective circumstances and unobservable personality traits that determine future outlooks and also navigate circumstances along the way, making it difficult to clearly establish the direction of causality. Despite these difficulties, a growing body of literature confirms the existence of a beliefs and behaviors channel that operates in a wide range of settings. The most recent research in this area attempts

to explore the causal channels, reaching across a wide range of disciplines, from economics, sociology, and psychology to the medical sciences.

De Neve and Oswald (2012) use a large U.S. representative panel to show that young adults who report higher life satisfaction or positive affect grew up to earn significantly higher levels of income later in life. They used twins and siblings as comparison controls and accounted for factors such as intelligence and health, as well as the human capacity to imagine later socioeconomic outcomes and anticipate the resulting feelings in current well-being. Diener, King, and Lyubormirsky (2005), meanwhile, review a number of psychological studies, including their own, and find that individuals with higher levels of cheerfulness and positive affect did better in later life, in both the income and friendship realms.

Ifcher and Zarghamee (2011) isolate the effects of mild positive affect in reducing time preferences over money and in the ability to delay gratification, based on experimental data. Oswald, Proto, and Sgroi (2015), also based on experimental data, show that positive affect induced by video clips resulted in subjects putting forth a greater quantity of output (10–12 percent), although with no difference in quality. They also found that bad moods induced by bereavement or illness in the subjects' families had a negative effect on productivity.

De Neve and coauthors (2013) conducted a general review of the existing research on well-being and positive outcomes. They found that the benefits in the health arena included improved cardiovascular health, boosted immune and endocrine systems, lowered risk of heart disease, stroke, and infection, healthier behaviors, speedier recovery, and increased survival rates and longevity. In the income and social arenas, the studies found that well-being linked to a range of benefits. These include increased productivity; higher peer-rated and financial performance; reduced absenteeism; greater creativity, cognitive flexibility, cooperation, and collaboration; higher income; greater organizational performance; reduced consumption and increased savings; boosted employment; reduced risk taking; greater prosocial behavior (altruism, volunteering), sociability, social relationships, and networks; *and* longer-term time preferences and delayed gratification.

Studies that specifically focus on the links between life satisfaction and health find effects that include reduced inflammation, better cardiovascular health and immune systems, and healthier behaviors, among others (Blanchflower et al., 2013; Davidson and Schuler (2015)). Of course it could be that healthier people are happier and not the other way around, or that causality runs in both directions (Graham, 2008). Some studies have been able to isolate the linkage from happiness to health, such as optimism predicting future outcomes such as immune function and cancer outcomes, controlling for health and demographic factors, and optimism and positive emotions protecting against cardiovascular disease (Boehm et al., 2012).

It is also important to note that in the literature cited above, the studies do not claim that happiness alone is the sole factor at play, nor that it can cure fatal diseases such as cancer, for example. The focus is on the associated positive character traits and biological markers of well-being that seem to play a positive and significant role in the process of healthy living and in facing the challenges of chronic disease as people age. The finding that unhappiness tends to be associated with the kinds of behaviors that limit life spans complements those above that highlight the positive channels between happiness, better health, and longevity.

Well-being plays an important role in workplace and employment. Rath and Harter (2014)

leveraged Gallup Panel data to study the relationship between first year of employees' well-being and employer-realized costs in the following year. Employees' well-being is critical to achieving the goals and mission of companies, as those who are thriving in overall well-being have significant lower health-related costs and lower turnover cost compared with employees who are struggling or suffering. Witters and Agrawal (2015) also concluded well-being is a major factor that influences employee performance. Employees with strong well-being are less likely to miss workdays because of poor health, less likely to change employers, and more likely to report "excellent" performance by their organizations.

There are also linkages between well-being and individual and social behaviors, as De Neve et al. (2013) note in their review. Positive affect seems to link to lower discount rates in terms of consumption, and happy individuals seem to be motivated to pursue long-term goals despite short-term costs. In contrast, lack of self-control is related to overconsumption and unhappiness, as in the case of excessive television watching, cigarette smoking, and obesity (Frey and Stutzer, 2007; Gruber and Mullanaithan, 2005; Graham, 2008). Greater self-control and longer-term time preferences among happier people are associated with consumption and savings behaviors. Based on longitudinal household data from Germany and the Netherlands, Guven (2012) finds that happier people are more likely to consume less and save more than others, and have higher perceived life expectancies. Goudie et al. (forthcoming) find that individuals with higher levels of subjective well-being are more likely to wear seatbelts and less likely to be in motor vehicle accidents, highlighting longer time preferences and less risk taking. Witters and Liu (2018) find that individuals with lower levels of well-being were more likely to vote for the anti-system candidate in the 2016 elections in the U.S., despite the clear risks that entailed (Herrin et al., 2018).

As noted above, there is a related and relatively new emphasis in economics on non-cognitive skills in determining economic choices and behaviors. Measures of these skills include personality traits such as conscientiousness, extraversion, openness to experience, and emotional stability; creativity; and self-esteem. Echoing many above-cited works, findings of research in this area show these skills to be important predictors of educational and labor market outcomes, such as completing higher levels of education, productivity, retention rates, and wage levels (see, for example, Bowles, Gintis, and Osborne, 2001).

In this context and with the general focus on differential discount rates, it is worth noting the growing gap in life expectancy between rich and poor in the United States. While an average man in the upper income bracket is expected to live to age eighty-nine, and the average woman in that bracket to age ninety-two, the average man/woman in the lower income brackets is expected to live to seventy-six and seventy-eight years, respectively. Differential behaviors explain some of this, meanwhile. The poor are much more likely to be obese and to smoke cigarettes than are the rich, for example (Ehrenfreund, 2015).

Yet those behaviors explain only a third of the gap; the rest stems from a range of factors, from stress (which, as noted above, makes it more difficult for individuals to have long-term time horizons), early childhood health, and even prenatal differences. In addition, the latest mortality data, highlighted in Case and Deaton (2015), suggest an important role for suicide, drug and opioid addiction, and other self-inflicted or desperation-related causes of death among these cohorts.

In recent research, meanwhile, one of us (Graham, in collaboration with Sergio Pinto, 2018) has found robust matches between lack of hope and premature mortality at the level of individuals, race, and place, with less than college educated, middle-aged whites in the U.S. having the highest rates of both despair and death. Kelsey O'Connor and Graham (2018), meanwhile, find that of the respondents in the

PSID data born between 1935 and 1945, those who report to be optimistic about their futures in their twenties are much more likely to be alive in 2015. We also find that the only group that experienced drops in optimism over time were the less than college-educated, and those declines began in the late 1970's; this is precisely the cohort that is most represented in the deaths of despair crisis today.

In what follows below, we return to our original approach and analysis on Russian data for 1995-2000, and explore data for U.S. respondents in much more recent years (2014-2016). Once again, we pose the original question of whether or not happiness “pays” in terms of future outcomes. The Russia analysis focused on a general life satisfaction question, with slightly different phrasing but also a marker of evaluative rather than hedonic well-being. In this paper, we also focus on an evaluative metric of well-being with slightly different question phrasing: life satisfaction as measured by the Cantril ladder question in the Gallup polls (see Table 1).

Data and Methods

Our data is from the Gallup Health Experience Panel. It is a web-based survey completed by 13,553 national adults, aged 18 and older, interviewed in 2014 and 2016. Of these, 9536 respondents had non-missing demographic information in both years.² Due to changes in key questions during the period, we use the 2014-16 segment, as the questions on race and employment status, among other things, were consistent for those years. The panel has a wide range of questions about socioeconomics and demographics, such as age, gender, education level, marital, and employment status, and income. It also has detailed questions on health status and behaviors, ranging from self-reported physical and mental health status, and how much respondents drink, smoke, and exercise, among other things. Descriptive statistics are in Table 1.

Table 1: Basic Variables

Variable	2014		2016		Questions
	mean	s.d.	mean	s.d.	
Current Life Evaluation	7.268	1.590	7.277	1.595	Please imagine a ladder with steps numbered from zero at the bottom to ten at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time? 10 Best possible - 0 Worst possible
Future Life Evaluation	7.666	1.760	7.456	1.846	On which step do you think you will stand about five years from now? 10 Best possible - 0 Worst possible
Age	56.391	13.329	58.538	13.331	

² The Gallup Panel is a probability-based longitudinal panel of U.S. adults who Gallup selects using random-digit-dial phone interviews that cover landline and cellphones. Gallup also uses address-based sampling methods to recruit Panel members. The Gallup Panel is not an opt-in panel and members do not expect to receive incentives for participating. In addition to sampling error, as always question wording and practical difficulties in conducting surveys can introduce error and bias into the findings of public opinion polls.

Age-Squared	3357.609	1461.806	3604.360	1518.478	Age * Age
Log of Income	11.324	.689	11.407	.665	Annual household income. Take the middle point of each category and log transformed
Education Level	2.585	.655	2.612	.631	1 = High school or less; 2 = Technical/vocational school or some college; 3 = College or above
Drinking	.363	.481	.380	.485	0 = Drink 5 days or less in last 30 days; 1 = Drink more than 5 days in last 30 days.
Male	.529	.499	.529	.499	1 = Male; 0 = Female
Race	2.006	.294	2.006	.294	1 = Black; 2 = White; 3 = Hispanic
Married	.702	.457	.690	.462	1 = Married; 0 = Unmarried
Employment Status	1.384	.574	1.431	.565	1 = Employed; 2 = Retired/Students/Home Maker; 3 = Unemployed
Smoke	.093	.291	.078	.268	1 = Smoker; 0 = Non-smoker
Poor Physical Health	.254	.435	.258	.438	During the past month, for about how many days did poor physical health keep you from doing your usual activities, such as self-care, work, or recreation? 1 = 2+ days; 0 = 0-1 day
Poor Mental Health	.264	.441	.269	.443	How many days during the past month was your mental health or emotional well-being not good? 1 = 2+ days; 0 = 0-1 day

While the panel aims to be nationally representative, black representation in this particular survey is disproportionately low (5% of respondents), due to low response rate. This with the much larger Gallup-Sharecare daily poll, which is a cross-section sample of 500 Americans per day.³ In both of these other surveys, black respondents make up roughly 10% of the sample, which is much closer to the actual population distribution. As we cannot explain the higher non-response rate in this particular panel, we are very cautious in drawing any conclusions about differences across races in our results.

That said, even though blacks are under-sampled, there is an important consistency in the life satisfaction and optimism levels across races in our panel compared to the larger Gallup sample. While blacks (on average) do not have significantly different current life satisfaction results than whites (with Hispanics having modestly higher levels, they are much more optimistic about the future, as assessed by a future life satisfaction), with the greatest gap being between *poor* blacks and *poor* whites.⁴ The difference is surprisingly consistent across several years (2010-2016) in the Gallup daily poll. Blacks and Hispanics also report lower levels of stress across these years, and are less vulnerable to “deaths of despair”, even though they typically face greater obstacles – such as discrimination, lower quality schools, and unequal

³ In part, this is because black response rates to Gallup Polls are, on average, lower. Thus, when the survey requires repeated participation by the same individuals, the low response rate is compounded.

⁴ Mean future life satisfaction averaged across the two years in the panel is 8.08 for blacks, 7.56 for whites, and 8.01 for Hispanics. Across the poor cohorts the differences are larger: 7.89 for blacks, 7.07 for whites, and 7.73 for Hispanics. (Authors’ calculations).

access to health care. It is at least suggestive of higher levels of resilience (Graham and Pinto, 2018; Assari et al, 2016).

Our method in this paper, meanwhile, is virtually identical to that used in Graham, Eggers, and Sukhtankar for Russia, as part of the aim is to see if the results hold for a very different sample population and time-period. “Happiness” here is life satisfaction in the evaluative sense. Our Russia analysis is based on a 5 point general life satisfaction question, while for the U.S. it is based on the Cantril ladder of life question, which asks respondents to place their life on a rung an 11 point ladder representing the best possible life.

We begin with the simple correlates of happiness – for the years 2014 and 2016.⁵ We then run a first difference regression looking at changes in happiness from 2014-2016, using first a straight OLS approach (Formula 1), and then a fixed effects specification (Formula 2). We then ran a two-staged regression approach (again as in the 2004 paper). In the first stage, we run a straightforward correlates of happiness regression – using the standard variables - with the 2014 data, and isolate the residual or unexplained happiness level of each respondents. We then run a second stage regression, with 2016 log income as the dependent variable, and 2014 unexplained happiness as the key explanatory variable. We also control for 2014 sociodemographic and economic indicators, including log income, and health status and behaviors.

Multiple Linear Regression (Ordinary Least Squares estimation):

$$y_i = \beta_0 + \sum_{j=1}^p \beta_j x_{ij} + \varepsilon_i \quad (\text{Equation 1})$$

Where:

β_0 is the regression intercept

β_j represents the regression slope for the j-th predictor

ε_i is the error term

Fixed Effects Model:

$$y_{it} = x_{it}'\beta + \alpha_i + \eta_{it} \quad (\text{Equation 2})$$

Where:

α_i is the unobserved characteristics for each entity

x_{it} represents independent variable, observed characteristics for each entity

η_{it} is the error term

In a separate regression, we added an additional variable that was not in the 2004 data, which is expected life satisfaction. Respondents report where they think their life satisfaction will be in 5 years on the same ladder that they report their current life satisfaction to be. In separate recent work, we have found this question to be a good proxy for raw optimism (see Graham and Pinto, 2018). This allows us to

⁵ It is important to note that the 2016 interviews took place in May- June, not at the time of the November election, which would have biased the results.

see if residual happiness and future life satisfaction are capturing the same innate but unobservable traits that are associated with happiness.

We use the same unexplained happiness and future happiness variables (separately) from 2014 - as well as change in log income - in regressions where we look at 2016 outcomes in the employment, marriage, and health (both mental and physical) rounds.

Finally, we return to the more typical approach and question, and explore the effects of 2014 and 2016 income on 2016 current and expected happiness separately, but including 2014 unexplained happiness and 2014 future happiness as independent variables (in separate specifications).

Analysis and Results

Beginning with our most basic specification, we find that the usual correlates of happiness hold for our panel for both 2014 and 2016. We get the standard U-shaped association between happiness and age in the panel data, for example, with the low point in happiness being at 48 years for 2016. Women are happier than men, and married respondents are happier than single ones. Income (logged) correlates equally strongly with happiness in both 2014 and 2016. The unemployed are less happy than both employed respondents and retirees, home-makers, and students. Those with college education and above are happier than those with lower levels of education (although this finding is significant in 2014 but just short of it in 2016). While income variables often dominate and pick up the positive “happiness” rewards to education, we have no way of explaining the change between these two years. Hispanics are modestly happier than both non-Hispanic whites and blacks although, as noted above, blacks and Hispanics are more optimistic about the future than are whites, with the largest gaps between poor blacks and poor whites.

Not surprisingly, respondents in poor physical and mental health are much less happy than those in better health conditions (defined as experiencing less than two unhealthy days during the past month). Respondents who drink more than five days a month are happier than those who drink less, and smokers are less happy than non-smokers. While none of these findings is a surprise, they confirm the general consistency of these patterns across most people in most places on the one hand, and that our panel respondents respond consistently within that frame. The results are in Table 2.

Table 2: The Correlates of happiness, 2016 and 2014

Variables	2016				2014			
	Coef.	s.d	t	Sig	Coef.	s.d	t	Sig
Smoker	-.2212	.0536	-4.13	.000	-.2577	.0537	-4.80	.000
Drink more than 5 days in last 30 days	.1437	.0305	4.71	.000	.1087	.0320	3.40	.001
Male	-.2171	.0296	-7.33	.000	-.2390	.0308	-7.77	.000
Some college ¹	-.0108	.0591	-.18	.856	-.0231	.0652	-.35	.724
College and above ¹	.1020	.0552	1.85	.065	.1582	.0615	2.57	.010
White ²	.1498	.0764	1.96	.050	.0329	.0796	.41	.679
Hispanic ²	.3243	.1004	3.23	.001	.2908	.1076	2.70	.007
Married	.1519	.0343	4.43	.000	.1621	.0367	4.42	.000
Retired/Student/Home maker ³	.2861	.0371	7.70	.000	.2138	.0403	5.30	.000

Unemployed ³	-.5755	.0813	-7.08	.000	-.4903	.0733	-6.69	.000
2+ days poor physical health	-.8240	.0347	-23.73	.000	-.5179	.0363	-14.25	.000
2+ days poor mental health	-1.0013	.0342	-29.31	.000	-1.0463	.0355	-29.47	.000
Log Income	.4278	.0259	16.55	.000	.5316	.0262	20.31	.000
Age	-.0192	.0075	-2.54	.011	-.0400	.0078	-5.10	.000
Age-Squared	.0002	.0001	3.55	.000	.0005	.0001	6.61	.000
(constant)	2.9278	.3505	8.35	.000	2.2159	.3486	6.36	.000
N	8752				8031			
Adjusted R-square	.2788				.2834			

D.V.: Current life evaluation in 2016 and 2014 respectively (OLS)

¹: Reference group is high school or less; ²: Reference group is Black; ³: Reference group is employed

In contrast, our first difference regression on changes in happiness (both with and without fixed effects) yields a few surprises. One surprise is that positive *changes* in log income are *not* significantly associated with changes in happiness.⁶ This suggests that permanent income is more important to happiness than is transient income, at least in the current U.S. context. This is consistent with the life-cycle theory of consumption, as well as with the behavioral economics literature showing that individuals value losses disproportionately to gains. A few studies have explored this, with mixed results, in part depending on how volatile income flows are in the particular context (Bayer, 2012; Cai and Park, 2016; DiTella et al. 2001; Graham, 2011).

The two other surprises are that respondents who stayed single are happier than those who stayed married, and those who kept smoking are happier than those who quit smoking or those who remained non-smokers.⁷ The former may be due to an evolution in norms of marriage, with a larger proportion of the population choosing to stay single or cohabitate rather than to get married. The smoking likely reflects how difficult it is to quit smoking and the short-term adjustments required, which are likely to be the prevalent features, given the two-year frame. Meanwhile, the sample of those respondents who kept smoking is rather small and skewed to older cohorts, it is still surprising finding that they seem happier than non-smokers, as on average (and in the rest of our findings), non-smokers are happier than smokers.⁸ In contrast to smoking, though, changes in drinking habits seem to have no significant effects [Table 3a].

Table 3a: First Difference Regression

Variables	Coef.	s.d.	t	Sig
Constant Demographics:				
Age	.0154	.0088	1.75	.080
Age-Squared	-.0002	.0001	-2.15	.031
Male	.0444	.0345	1.29	.199
White	.1714	.0931	1.84	.066
Hispanic	.0937	.1234	.76	.448

⁶ It is possible that by truncating the distribution, the log income specification understates the effects of income changes, particularly at the top end; we stuck to the log specification to retain consistency with the Russia study.

⁷ These results hold with and without the health controls included.

⁸ In an additional attempt to explain the kept smoking finding, we ran the regression without the mental and physical health variables included, in case they were picking up the negative effects of smoking, but we get essentially identical results.

Change Log Income	.0646	.0464	1.39	.164
Change of Education Levels	.0804	.1156	.70	.487
Change in smoking (Reference group: Remained non-smoker)				
Quit smoking	-.2344	.1316	-1.78	.075
Started smoking	-.1074	.1674	-.64	.521
Kept smoking	.1537	.0650	2.36	.018
Change in drinking (Reference group: Drink the same at high frequency (more than 5 days in last 30 days))				
Drink more (from less than 5 days to more than 5 days in last 30 days)	.0594	.0691	.860	.390
Drink less	-.0915	.0771	-1.19	.235
Drink the same at low frequency (less than 5 days in last 30 days)	.0327	.0382	.860	.391
Change married (Reference group: Remained unmarried)				
Got married	-.1646	.1072	-1.54	.125
Got divorced	.1823	.1037	1.76	.079
Stay married	-.0808	.0391	-2.06	.039
Change Retired (Reference group: Remained non-retiree)				
Became retired	-.0621	.0666	-.93	.351
Came out of retirement	-.1169	.1471	-.79	.427
Stayed retired	-.0848	.0543	-1.56	.119
Change employment (Reference group: Remained unemployed)				
Got employed	.1300	.1636	.79	.427
Got unemployed	-.1603	.1841	-.87	.384
Stayed employed	-.0913	.1272	-.72	.473
Poor physical (Reference group: Remained physically healthy)				
Became physically healthier ¹	.1572	.0527	2.98	.003
Became physically unhealthier ²	-.362	.054	-6.68	.000
Stayed physically unhealthy	-.102	.055	-1.87	.061
Poor mental (Reference group: Remained mentally healthy)				
Became mentally healthier ³	.370	.058	6.38	.000
Became mentally unhealthier ⁴	-.525	.056	-9.42	.000

Stayed mentally unhealthy	-.016	.050	-.32	.751
(Constant)	-.272	.287	-.95	.342
Observations	5476			
Adjusted R-squared	0.047			

D.V.: Change of current life evaluation 2014 -- 2016 (OLS)

The definitions are as follows:

- 1) moving from more than 2 days to less than 2 days that poor physical health keeps you from doing your usual activities, such a self-care, work, or recreation, during the past month;
- 2) moving from less than 2 days to more than 2 days that poor physical health keeps you from doing your usual activities, such a self-care, work, or recreation, during the past month;
- 3) moving from more than 2 days to less than 2 days that mental health or emotions well-being not good during the past month;
- 4) moving from less than 2 days to more than 2 days that mental health or emotions well-being not good during the past month.

Less surprising is the result that respondents who became unemployed or experienced a deterioration in their mental or physical health status during the period experienced a drop in happiness (although the finding is just short of significant). Finally, the results with and without fixed effects are essentially identical [Table 3a and Table 3b].

Table 3b: Change of Current Life Evaluation with Fixed Effects

Independent variables	Fixed Effects Model			
	Coef.	s.d.	t	Sig
Age	.1534	.0378	4.06	.000
Age Squared	-.0013	.0003	-4.07	.000
Male (omitted)				
White (omitted)				
Hispanic (omitted)				
Log Income	.0505	.0463	1.09	.275
Some College	.2474	.1720	1.44	.150
College and above	.0987	.2308	.43	.669
Smoker	.0934	.1027	.91	.363
Drink more than 5 days in last 30 days	.0735	.0468	1.57	.116
Married	-.1651	.0715	-2.31	.021
Retired/Student/Home maker	-.0662	.0531	-1.25	.213
Unemployed	-.1999	.0848	-2.36	.018
2+ days Poor Physical Health	-.2589	.0344	-7.53	.000
2+ days Poor Mental Health	-.4520	.0366	-12.35	.000
(Constant)	2.6424	1.3427	1.97	.049
Observations	16,781			
R Square:	Within	.045		
	Between	.0669		
	Overall	.0664		

D.V.: Current life evaluation in 2014/2016

In our main specification – the effects of unexplained happiness in period one on income in period two – our results are remarkably similar to those based on the 1995-2000 panel for Russia. Unexplained happiness has a statistically significant and robust association with future income in our panel, with a one-point increase in unexplained happiness in 2014 associated with a 1.5% increase in log income in 2016. As in the case of the Russia findings, unexplained happiness is modestly more important for the poorest groups than for the richest ones, as the coefficient for unexplained happiness is negative, with the poorest quintile as the reference group (although the finding is just short of significant here). [See Table 4b, regression c] It is intuitive, though, that a cheerful or positive attitude is likely most important to the employment outcomes of the less skilled in the services industry, where it is more difficult to make decisions on employability based on skill differentials, than it is for the workplace success of those who have more skills and education to leverage their performance.

Log income in 2014, not surprisingly, is also positively associated with income in 2016, and the coefficient is much larger than that of unexplained happiness. That association, though, is weaker for the poor than for the rich, with the coefficient for the poor negative and significant. This reflects the more stable nature of the income of the rich than that of the poor, whose income flow, jobs, and existence, tend to be much less stable than those of the rich. The incomes of those in the middle are likely more stable, while the rich have much more income to leverage their futures, particularly via investing in their education and health, which, in turn, link closely to happiness.

Table 4a: The Effects of Happiness on Income

Independent variables	Regression a		Regression b	
	Coef.	t	Coef.	t
Age	.0021	.97	0.0061	2.31
Age-Squared	.0000	-2.20	-0.0001	-2.96
Smoker	-.0476	-3.21	-0.0786	-4.36
Drink more than 5 days in last 30 days	.0109	1.21	-0.0385	-3.53
Male	.0176	2.04	0.0157	1.49
Some college	.0168	.92	0.0415	1.87
College and above	.0616	3.59	0.1193	5.71
White	.0058	.25	0.0014	0.05
Hispanic	.0105	.34	0.0147	0.39
Married	.0669	6.59	0.1735	14.27
Retired/Student/Home maker	.0118	1.04	-0.0367	-2.67
Unemployed	-.0217	-1.04	-0.2284	-9.08
2+ days poor physical health	-.0222	-2.19	-0.0508	-4.12
2+ days poor mental health	-.0295	-2.97	-0.0560	-4.64
Log income 2014	.7947	106.60		
Log income 2014, poor ¹			-0.6998	-56.55
Log income 2014, rich ¹			0.4267	29.37
Unexplained happiness ²	.0146	4.66	0.0149	3.91
(Constant)	2.3733	24.08	11.3853	143.92
# Observations	6781		6781	

Adjusted R-squared	.723	.590
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D.V.: Log income in 2016 (OLS)

¹: 'Poor' is defined as bottom 40 percent of the household income distribution in 2014; 'rich' is the highest 20 percent of the household income distribution in 2014

²: The residual of happiness 2014 OLS regression (Table 2)

An additional finding is that expected future happiness in 2014 works essentially the same way as residual happiness with future income, with a significant and positive correlation and a modestly lower coefficient (once again controlling for 2014 log income, socio-economic, and demographic variables). This suggests that the two variables are capturing similar although likely not identical personality traits. [Table 4b, regression d].

Table 4b: The Effects of Happiness on Income

Independent variables	Regression c		Regression d	
	Coef.	t	Coef.	t
Age	0.0022	1.00	.0029	1.27
Age-Squared	0.0000	-2.24	.0000	-2.28
Smoker	-0.0478	-3.23	-.0470	-3.07
Drink more than 5 days in last 30 days	-0.0112	-1.25	.0080	.87
Male	0.0179	2.07	.0222	2.50
Some college	0.0166	0.91	.0144	.75
College and above	0.0613	3.57	.0583	3.22
White	0.0058	0.25	.0107	.45
Hispanic	0.0104	0.34	.0123	.39
Married	0.0666	6.57	.0683	6.57
Retired/Student/Home maker	0.0115	1.01	.0095	.82
Unemployed	-0.0221	-1.06	-.0225	-1.03
2+ days poor physical health	-0.0222	-2.18	-.0188	-1.79
2+ days poor mental health	-0.0296	-2.98	-.0201	-1.93
Log income 2014	0.7946	106.53	.7897	101.20
Unexplained happiness ¹				
Unexplained happiness, second quintile	-0.0016	-0.23		
Unexplained happiness, third quintile	0.0120	1.62		
Unexplained happiness, fourth quintile	0.0017	0.24		
Unexplained happiness, fifth quintile	-0.0069	-0.79		
Expected happiness 2014			.0109	3.99
(Constant)	2.3740	24.08	2.3076	22.60
# observations	6781		6423	
Adjusted R-squared	.723		.722	

D.V.: Log income in 2016 (OLS)

¹: The residual of happiness 2014 OLS regression (Table 2)

As in the case of the results for Russia, we find that, in addition to income, unexplained happiness is associated with better outcomes in the labor market, health and social arenas. Respondents with higher levels of unexplained happiness in 2014 are more likely to get married and to report improvements in both their physical and mental health in 2016. Respondents with higher levels of unexplained happiness in 2014 were also less likely to become unemployed or get divorced during the time-period [Table 5a and Table 5b].

Table 5a: The Effects of Happiness on Socio-economic Variables

Dependent Variables:	Unemployed in 2016		Got divorced		Got married	
	Coef.	z	Coef.	z	Coef.	z
Independent Variables						
Age	.1334	2.76	-.0907	-2.33	-.0380	-1.06
Age-Squared	-.0015	-3.09	.0011	3.14	.0001	.34
Smoker	.5047	2.41	.5337	2.26	-.0251	-.10
Drink more than 5 days in last 30 days	.1857	1.07	.2476	1.57	.3730	2.22
Male	-.1065	-.68	-.4506	-2.95	.1178	.71
Some college	.3950	1.28	.0951	.33	-.3346	-.95
College or above	.3775	1.27	.1374	.50	-.7224	-2.17
White	.5458	1.13	-.6250	-1.58	.3898	1.00
Hispanic	.2572	.41	-.4297	-.79	.4417	.87
Married	.3640	2.00				
Retired/student/home maker	.2733	1.20	-.6185	-3.18	-.0463	-.17
Unemployed	3.4472	19.14	-1.1400	-2.14	.6172	1.92
Poor physical health	.7122	4.27	.0406	.23	.0608	.31
Poor mental health	.3140	1.88	.6421	3.91	-.3959	-2.06
Unexplained happiness ¹	-.1445	-3.07	-.1600	-3.18	.1354	2.15
Log income 2014	-.7821	-6.53	-.9967	-7.40	1.1456	7.67
Change log income	-.7151	-4.09	-1.3669	-7.60	1.1438	5.27
(Constant)	.6144	.34	10.5257	5.76	-13.2560	-7.04
# Observations	6781		4705		2076	
Pseudo R-squared	.337		.107		.107	

Regression method: Logistic regression

¹: The residual of happiness 2014 OLS regression (Table 2)

Table 5b: The Effects of Happiness on Socio-economic Variables

Dependent Variables:	Became physically healthy		Became mentally healthy	
	Coef.	z	Coef.	z
Independent Variables				

Age	-.0585	-1.78	.0136	.45
Age-Squared	.0004	1.30	.0001	.27
Smoker	.0650	.33	.0086	.05
Drink more than 5 days in last 30 days	.0597	.46	-.2914	-2.42
Male	.2128	1.81	.1683	1.49
Some college	-.2408	-1.08	-.3020	-1.25
College or above	-.0506	-.24	-.1215	-.53
White	-.4804	-1.30	-.0519	-.16
Hispanic	-.7309	-1.54	.1511	.35
Married	.0847	.63	.3232	2.50
Retired/student/home maker	-.4297	-3.00	-.0779	-.53
Unemployed	-.5760	-2.44	-.5094	-2.00
Poor physical health			-.4511	-3.86
Poor mental health	-.9498	-7.98		
Unexplained happiness ¹	.2622	6.60	.2152	5.68
Log income 2014	.4946	4.74	.2060	2.12
Change log income	.2092	1.32	.3273	2.15
(Constant)	-2.5851	-1.78	-3.9135	-2.92
# Observations	1449		1522	
Pseudo R-squared	.119		.058	

Regression method: Logistic regression

¹: The residual of happiness 2014 OLS regression (Table 2)

Controlling for unexplained happiness, 2014 income also has a positive and significant effects on improving both physical and mental health. The changes of income between the two years has a positive effect on becoming mentally healthier (likely due to a better financial security); however it does not have a significant influence on physical health recovery, perhaps due to the relatively short time period.

We again also looked at future happiness instead of residual happiness, and find that the associations are less robust. While 2014 future happiness is positively associated with reported improvements in mental and physical health in 2016, it was not significantly associated with divorce, marriage, or unemployment. Unexplained or residual happiness, due to its two-staged construction rather than one time self-report (which is quite speculative) may be better for capturing a broader range of character traits that we cannot observe here, such as self-esteem and internal locus of control, among others.⁹ [Table 6a and Table 6b].

Table 6a: The Effects of Expected Happiness on Socio-economic Variables

Dependent Variables:			
	Unemployed 2016	Got divorced	Got married

⁹ Graham and Ruiz-Pozuelo (2018) explore the (strong) linkages between such traits and happiness and education aspirations in a novel survey of poor 18-19 year old young adults in Peru.

Independent Variables	Coef.	z	Coef.	z	Coef.	z
Age	.1361	2.69	-.0650	-1.54	-.0362	-1.04
Age-Squared	-.0015	-3.02	.0008	2.18	.0001	.42
Smoker	.4962	2.24	.5484	2.24	-.2343	-.82
Drink more than 5 days in past 30 days	.1279	.71	.2130	1.30	.3708	2.17
Male	-.0762	-.46	-.4263	-2.68	.1664	.98
Some college	.6118	1.74	.0257	.09	-.3708	-1.01
College or above	.6717	1.96	.0431	.15	-.7241	-2.09
White	.5286	1.01	-.4351	-.96	.5444	1.32
Hispanic	.3325	.51	-.1244	-.21	.5539	1.06
Married	.2774	1.46				
Retired/student/home maker	.1565	.64	-.6052	-2.98	-.0673	-.25
Unemployed	3.4109	18.35	-.9792	-1.82	.4922	1.44
Poor physical health	.6870	3.94	.0626	.35	.0427	.21
Poor mental health	.2531	1.41	.7145	4.09	-.3328	-1.66
Expected happiness 2014	-.0803	-1.95	.0314	.69	.0991	1.64
Log income 2014	-.7332	-5.74	-1.0675	-7.44	1.0658	6.95
Change log income	-.7494	-4.07	-1.4181	-7.58	1.0839	4.92
(Constant)	.4984	.27	10.3417	5.40	-13.4126	-6.89
# Observations	6423		4460		1963	
Pseudo R-squared	.329		.098		.103	

Regression method: Logistic regression

Table 6b: The Effects of Expected Happiness on Socio-economic Variables

Dependent Variables:	Became physically healthy		Became mentally healthy	
Independent Variables	Coef.	z	Coef.	z
Age	-.0480	-1.42	.0154	.47
Age-Squared	.0003	1.11	.0001	.39
Smoker	.0847	.41	.1194	.63
Drink more than 5 days in past 30 days	.1382	1.03	-.3711	-2.93
Male	.2793	2.27	.2565	2.15
Some college	-.3619	-1.48	-.4497	-1.72
College or above	-.3050	-1.32	-.2851	-1.15
White	-.3403	-.88	.1266	.36
Hispanic	-.7344	-1.51	.2775	.61
Married	.0881	.63	.3157	2.32
Retired/student/home maker	-.4502	-2.99	-.1671	-1.07
Unemployed	-.7152	-2.76	-.4797	-1.73

Poor physical health			-.3123	-2.54
Poor mental health	-.8338	-6.63		
Expected happiness 2014	.2283	6.81	.2309	6.78
Log income 2014	.3590	3.23	.1255	1.20
Change log income	.1816	1.11	.2817	1.76
(Constant)	-3.0844	-2.06	-5.0459	-3.56
# Observations	1349		1407	
Pseudo R-squared	.128		.069	

Regression method: Logistic regression

In all of these arenas, from finding a mate to holding down a job to managing health, optimism or a generally positive attitude seems to play a role, although it is surely not the only factor. Guven, Senik, and Stichnoth (2010), for example, find that the probability of divorce is highest when there are asymmetries in happiness levels – with one person in the partnership being unhappy, based on panel data for Germany. A number of studies (cited above), meanwhile, suggest a positive link between higher levels of subjective well-being and a range of health outcomes. Finally, as the Russia paper also suggests, a cheerful or positive attitude is likely most important to the employment outcomes of the less skilled in the services industry, as it is more difficult to make decisions on employability based on skill and education differentials, and positive attitudes matter more to workplace success.

Finally, as an additional robustness check, we ran the more usual specification of the effects of income on happiness and, for the most part, the usual patterns hold. Happiness in 2016 is the dependent variable, and we include log income for both 2014 and 2016. Interestingly, 2014 (past) income is more important (almost four times in relative terms) to 2016 happiness than is 2016 (current) income, again suggesting that changes in income matter less than does permanent income and the stability that comes with it. [Table 7a] We control for 2014 unexplained happiness and find an unsurprising strong association with 2016 happiness. The coefficient on future happiness in 2014 (in a separate regression) is very close to that of residual happiness, and in this case the coefficient is slightly smaller than that of residual happiness. Again, it seems that these variables, while quite similar, are not identical. [Table 7a, regression d]

Most of our other control variables work in the expected direction and as in the earlier regressions, with married and employed respondents happier than unmarried and unemployed ones, smokers less happy than non-smokers and drinkers happier than non-drinkers. Women are happier than men, and Hispanics are happier than either blacks or whites. Finally, we again do not get a significant finding on education levels. Given that we have both past and current income in the regression, it is likely that they dominate education effect (and dominate the linked association). [See Tables 7a, b]

In addition, both 2014 and 2016 income have similar positive and significant effects on 2016 expected happiness. However, adding 2014 expected happiness in predicting 2016 expected happiness, 2016 log income becomes insignificant, likely due to the dominant effect of innate optimism. [Table 7c]

Table 7a: The Effect of Income on 2016 Happiness:

	Regression a	Regression b
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Independent variables	Coef.	t	Coef.	t
Age	-.0182	-2.26	-0.0171	-2.12
Age-Squared	.0002	3.28	0.0002	3.22
Smoker	-.1821	-3.35	-0.1874	-3.44
Drink more than 5 days in past 30 days	.0778	2.39	-0.0818	-2.50
Male	-.1642	-5.23	-0.1646	-5.22
Some college	-.0330	-.50	-0.0202	-0.31
College and above	.0563	.91	0.0716	1.15
White	.1600	1.89	0.1556	1.83
Hispanic	.3256	2.90	0.3238	2.87
Married	.1376	3.74	0.1649	4.48
Retired/Student/Home maker	.1977	4.87	0.1808	4.45
Unemployed	-.4682	-6.12	-0.5306	-6.93
2+ days poor physical health	-.4938	-13.51	-0.4970	-13.55
2+ days poor mental health	-.8618	-23.82	-0.8680	-23.91
Log income 2016	.1293	2.92	0.2901	7.97
Log income 2014	.3981	9.01		
Log income 2014, poor			-0.2026	-4.51
Log income 2014, rich			0.2135	4.63
Unexplained happiness ¹	.5931	52.25	0.5914	51.93
Constant	1.6657	4.41	4.3099	8.93
# observations	5567		5567	
Adjusted R-squared	.476		.473	

D.V.: Current life evaluation in 2016 (OLS)

¹: The residual of happiness 2014 OLS regression (Table 2)

Table 7b: The Effect of Income on 2016 Happiness:

Independent variables	Regression c		Regression d	
	Coef.	t	Coef.	t
Age	-0.0185	-2.30	0.0007	0.08
Age-Squared	0.0002	3.32	0.0002	1.95
Smoker	-0.1805	-3.32	-0.0529	-0.88
Drink more than 5 days in past 30 days	-0.0764	-2.35	0.0650	1.83
Male	-0.1652	-5.25	-0.0562	-1.63
Some college	-0.0318	-0.48	-0.0740	-1.00
College and above	0.0573	0.92	-0.0916	-1.31
White	0.1578	1.86	0.3941	4.21
Hispanic	0.3253	2.89	0.3716	3.04
Married	0.1393	3.78	0.1354	3.35
Retired/Student/Home maker	0.1980	4.88	0.1878	4.23

Unemployed	-0.4667	-6.09	-0.4127	-4.82
2+ days poor physical health	-0.4930	-13.46	-0.2965	-7.34
2+ days poor mental health	-0.8622	-23.81	-0.5412	-13.34
Log income 2016	0.1319	2.98	0.1574	3.26
Log income 2014	0.3961	8.96	0.1672	3.46
Unexplained happiness ¹				
<i>unexplained_happiness_14,second quintile</i>	0.0188	0.74		
<i>unexplained_happiness_14,thrid quintile</i>	-0.0496	-1.86		
<i>unexplained_happiness_14,fourth quintile</i>	-0.0042	-0.16		
<i>unexplained_happiness_14,fifth quintile</i>	0.0243	0.76		
Expected happiness 2014			0.4145	39.52
Constant	1.6638	4.41	-0.3214	-0.77
# Observations	5567		5263	
Adjusted R-squared	.476		.395	

D.V.: Current life evaluation in 2016 (OLS)

¹: The residual of happiness 2014 OLS regression (Table 2)

Table 7c: The Effect of Income on 2016 Expected Happiness:

Independent variables	Regression e		Regression f	
	Coef.	t	Coef.	t
Age	0.0088	0.73	0.0184	1.94
Age-Squared	-0.0004	-3.13	-0.0003	-3.24
Smoker	-0.1393	-1.72	-0.0006	-0.01
Drink more than 5 days in last 30 days	0.0279	0.58	-0.0048	-0.13
Male	-0.2670	-5.78	-0.1033	-2.85
Some college	0.1390	1.41	0.0576	0.73
College and above	0.2265	2.43	0.0248	0.33
White	-0.2941	-2.39	0.0027	0.03
Hispanic	0.1621	0.99	0.1475	1.15
Married	-0.0211	-0.39	-0.0071	-0.17
Retired/Student/Home maker	-0.0081	-0.14	-0.0483	-1.03
Unemployed	-0.3765	-3.27	-0.1982	-2.16
2+ days poor physical health	-0.5444	-10.10	-0.2145	-5.03
2+ days poor mental health	-0.7378	-13.85	-0.2561	-5.99
Log income 2016	0.2096	3.22	0.0274	0.54
Log income 2014	0.3247	4.98	0.1397	2.73
Expected happiness 2014			0.6434	57.60
Constant	2.7789	4.99	0.8465	1.93

# observations	5299	5104
Adjusted R-squared	0.168	0.4967

D.V.: Expected Life Evaluation in 2016 (OLS)

Conclusions

This paper confirms our much earlier work and shows that there is a two-way causality in the income-happiness relationship. While income matters more to future happiness than happiness matters to future income, there is still a statistically and materially positive association for the latter. The positive effects of happiness, meanwhile, seem to matter more for the poor and less skilled, who have less other advantages to leverage in the labor market, so that a positive attitude may have relatively more importance.

The positive effects of happiness, meanwhile, spillover into the labor and marriage markets, as well as into the physical and mental health arenas. Optimism, meanwhile, as captured by future life satisfaction, is also positively associated with better health outcomes but not with employment or marriage outcomes.

When we look at the effects of changes in key variables on changes in happiness, meanwhile, we find some surprises. While past and current income matter more in current happiness, for example, changes in income do not seem to matter to changes in happiness, suggesting that the links between income and happiness are stronger for permanent rather than transient income.

While smokers are on average less happy than non-smokers, and drinkers on average happier than non-drinkers, changes in these habits work differently. Respondents who quit smoking are on average less happy than those who do not (which may be due to the short term difficulties of quitting), while those who increase or decrease their drinking do not seem to experience changes in happiness. Also surprising is the finding that respondents who stay single are happier than those who stay married, which may reflect changing marriage norms over time.

There is also the question of whether our residual happiness and future happiness variables are capturing the same, unobservable personality traits. Future life satisfaction is a rather speculative question and seems to capture raw optimism. Our unexplained happiness variable, in contrast, which accounts for many observed factors in its construction, may be a better measure of a broader range of character attributes that we cannot observe here, such as self-esteem, internal locus of control, among others. While the two variables associate quite similarly with income and health outcomes in the future, unexplained happiness is more robustly associated with outcomes in the marriage and employment arenas. Perhaps the latter two are more predictable, particularly given the two-year time frame of our panel, but we really do not know. Understanding the differences in the unobservables underlying these two variables is a challenging question for future research.

While many unanswered questions remain, we hope that our findings contribute to the growing body of literature that shows that happiness in general, and more specifically defined dimensions of well-being and in particular unexplained optimism, matter to the future outcomes of myriad individuals. This occurs in different contexts and times, and across various important dimensions of life, including income, employment, and marriage outcomes, as well as in the health arena.

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