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Why is the world getting older?
The influence of happiness on mortality

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Why is the world getting older? The influence of happiness on mortality

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April 2009

Abstract

World life expectancy has risen by around 20 years in the last 50 years. This period has also witnessed rising happiness levels around the world suggesting that happiness might be one of the causes behind the decline in mortality. We investigate the relationship between happiness and mortality using the German Socio-Economic Panel. We consider doctor visits, self-reported health, and presence of chronic illness as health measures. After controlling for initial health conditions, we find that happiness extends life expectancy. 10 percent increase in happiness decreases probability of death by four percent, and this effect is more pronounced for men and younger people. Happiness plays a more important role for chronically ill people in decreasing mortality than for those who are not chronically ill. The positive influence of happiness on mortality can offset the negative impact of chronic illness. Marriage decreases mortality and this effect appears to work through increased happiness.

JEL Classification: D03, I10, I12.
Keywords: happiness; mortality; health; chronic illness.

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1 Introduction

Determinants of mortality, change in mortality rates over time, differences in mortality rates both across countries and across groups within countries are all phenomena worthy of serious attention by researchers (Cutler et al. 2006). Mortality has been shown to affect the levels of economic growth (Kalemli-Ozcan 2002). A rise in mortality directly affects fertility and human capital investment, and indirectly affects growth through increased unfunded social security contributions (Zhanga et al. 2001). As well, mortality risk can be very important for inheritance decisions (Hurd 1989). Moreover, information on mortality can also shed light on the nature of social inequalities, including gender bias and racial disparities (Sen 1998).

The literature also offers solid findings on the determinants of mortality. Physical and social conditions, access to medical facilities, science and technology are found to be critical factors for any coherent explanation of mortality (Sen 1998; Cutler et al. 2006). Considering individual characteristics, Oswald and Gardner (2004) show that non-economic factors can be more important than economic factors in explaining mortality. Danner et al. (2001) find a strong inverse correlation between positive emotional content and the risk of mortality. There is evidence to support a causal relationship between chronic stress, depression, and social support and development of coronary artery disease (Steptoe and Strike 2004).

Following the increased emphasis on the importance of psychological well-being and its strong impact on various outcomes including health, this paper investigates the relationship between self-reported happiness and mortality. Two pieces of information underlie the motivation of this work. First, Inglehart et al. (2008), in

an analysis of World Values Survey data for recent decades, report that "happiness rose in 45 of 52 countries for which substantial time series data were available." On the other hand, Oeppen and Vaupel (2002) report that world life expectancy more than doubled over the past two centuries, from roughly 25 years to about 65 for men and 70 for women. Brought together, these findings imply that increases in happiness levels may lie behind the increases in life expectancy.[1] Although individual characteristics such as marital status and income and other personal health conditions may play a role for these changes,[2] the literature is yet to show the causal relationship between happiness and mortality.

This paper employs data from the German-Socio Economic Panel (GSOEP), a longitudinal survey which has been interviewing around 15000 individuals in Germany since 1984. The GSOEP provides self-reported measures of well-being, i.e., responses to questions about how satisfied respondents are with their lives, together with a number of other individual characteristics. Moreover, the GSOEP includes various measures of health such as having a chronic illness, number of annual doctor visits, and self-reported health, which can be used to control initial health conditions of the individuals. We exploit the very long nature of the GSOEP, which offers a significant variation in mortality.[3]

This study presents several novel findings. We show that individual happiness

[1] A specific example of this can be Japan where life expectancy has been increasing together with happiness over the last twenty years despite the decline in average incomes.

[2] The explanatory power of individual characteristics for happiness have been found to be very low - the R-squared in the personal happiness regressions are generally less than 0.1. Also note that people may have quite different levels of happiness for given characteristics.

[3] The data show that the mortality rate in the sample in 1984 is around 17 percent. This means that 17 percent of the respondents surveyed in 1984 deceased between 1984 and 2007.

matters for mortality, even after controlling for various initial health measures.[4] We find that people who were happier in 1984 are four percent less likely to have died between 1984 and 2007, other things being equal. We also find that happiness matters more for men than women and for younger people than older people. Moreover, happiness plays a more important role for chronically ill people in decreasing mortality than for those who are not chronically ill. The positive influence of happiness on mortality can offset the negative impact of chronic illness.

We consider possible explanations as to why happiness matters for mortality.[5] Psychological studies argue that this can be due to optimism or self-esteem. In the GSOEP, respondents are asked about their perceived happiness for the previous year and expected happiness for next year and the following five years. Perceived happiness and expected happiness might give us an idea about individuals' general view on life (optimism). We find that perceived and expected happiness are both significant in explaining mortality.[6]

We present the secondary findings, namely, the role of parents's longevity, perceived relative income, and marriage in explaining mortality. We find that mother's longevity is significantly and negatively correlated with own mortality after controlling for individual characteristics. Father's longevity is less important (as well as less significant) than mother's longevity in explaining mortality. Married people live longer, an effect which appears to work through happiness. Interestingly, we

[4]Graham (2008) shows that happiness is positively correlated with health measures.

[5]Medical explanations that relate to human anatomy are beyond the scope of this paper. We focus on only factors that relate to psychological well-being.

[6]Since we use the level of happiness in one year (1984), it might not be a perfect measure for permanent happiness. Hence, we also consider the average of current, perceived, and expected happiness in the analysis.

find that perceptions about own income and status relative to neighbors are also important for mortality after controlling for own income.

Gravelle (1984) argues that without the guidance of detailed behavioral modeling of the relevant factors, empirical work on the determinants of mortality will be potentially misleading. Although we do not present a theoretical model in this paper, we believe that our empirical findings can provide useful insights for future research on behavioral modeling.

Section 2 gives an overview of the economic literature on the determinants of mortality. Section 3 discusses the data and the construction of the variables used in the paper. Section 4 presents the basic framework and estimation strategy, and then Section 5 presents the empirical findings of the paper. Section 6 concludes.

2 Literature on the Determinants of Mortality

There is widespread and longstanding consensus among researchers that life expectancy and *income* are positively correlated. However, it has proven much more difficult to establish a causal relationship between income and health as they are jointly determined. Snyder and Evans (2006) use a major change in the Social Security law as an exogenous variation in income to examine the impact of income on mortality in an elderly population. They find that the higher income group has a statistically significantly higher mortality rate.[7] On the other hand, *relative income* may also play a role in determining mortality. Miller and Paxson (2005) and Eibner and Evans (2005) show that people with high relative deprivation have

[7]Oswald and Rablen (2008) estimate that winning the Nobel Prize, compared to merely being nominated, is associated with between 1 and 2 years of extra longevity.

a higher probability of death. By using compulsory *education* laws from 1915 to 1939 as instruments for education, Lleras-Muney (2005) finds that education has a causal impact on mortality.

One of the more controversial topics in the literature examining the influence of *unemployment* on health is the hypothesized relation between unemployment and mortality. Forbes and McGregor (1984) find little evidence of a consistent association between unemployment and male mortality from all causes in different age cohorts. On the other hand, Gravelle (1984) argues that the link between unemployment and mortality is a plausible conjecture. As a result, there is no consensus on the relationship between unemployment and mortality.

Although *health* is conventionally believed to deteriorate during macroeconomic downturns, the empirical evidence supporting this view is quite weak and comes only from studies containing methodological shortcomings that are difficult to remedy (Ruhm 2004). Recent research that better controls for many sources of omitted variables bias instead suggests that mortality decreases and physical health improves when the economy temporarily weakens. This partially reflects reductions in external sources of death, such as traffic fatalities and other accidents, but changes in lifestyles and health behaviors are also likely to play a role (Ruhm 2004).

3 Data

The *German Socio-Economic Panel Study* (GSOEP) is a wide-ranging representative longitudinal study of private households in Germany. The same private

households, persons, and families have been surveyed annually since 1984. The GSOEP includes information on objective living conditions, values, willingness to take risks, current changes in various areas of life, and about the relationships and dependencies among these areas and the changes. Happiness is a categorical variable taking values 0-10 (where 0 is totally unhappy and 10 is totally happy) and available for every year in the survey. The GSOEP, importantly, has information on the years of death and birth for people who have been surveyed. There are 11557 people who were interviewed in 1984 with full information on individual characteristics. Out of 11557 people, 9643 are still alive in 2007 and 1914 of them deceased between 1984 and 2007. The mortality rate is 17 percent.[8] The income variable is real monthly total household income. The self-reported health variable is available after 1992 in the GSOEP. Annual number of doctors visits are available for every year but information on chronic illness is available only for 1984-1991. The GSOEP also includes information on mother's and father's longevity (years of birth and death are both known). Besides current happiness, perceived happiness concerning last year and expected happiness for the next year and the following years are also available. We also use retrospective labor market information (months of unemployment, months of full-time work) since the respondents were 15 years of age, as control variables.

Table 2 displays summary statistics, means and standard variations of the variables for the 1984 panel. The table presents the summary statistics for the

[8]The survey in 1984 was conducted only in the West Germany. Therefore, the paper also considers the 1992 panel where 12 592 people from both West-Germany and East-Germany were surveyed. Out of 12592 people, 11239 of them are still alive in 2007 and 1353 of them deceased between 1992 and 2007. The mortality rate is 11 percent.

whole sample, the people who are still alive in 2007, and the people who deceased between 1984 and 2007. Average happiness (out of 10) is 7.5 for the alive sample and is 7.3 for the deceased sample. The average of perceived happiness is lower (7.3) than current happiness but the standard deviation is much higher (2.4). The expected happiness gap between the deceased and the alive sample is higher than the happiness gap in the current year. As expected, the alive sample is relatively younger in 1984 with an average age of 38 and 62.5 for the deceased sample. Average age in the whole sample is 42.6. The sample is quite diverse in terms of age with a variation of 16.9. Average income is higher for the alive sample. Number of children seems to be important for mortality. Mother's longevity seems to be much lower for the deceased sample. Father's longevity does not differ between the alive and deceased samples.

Consider working status: 23 percent of the dead sample was working full-time however only 12 percent of the alive sample were full-time workers. Consider marital status: widowed are more likely to have died however singles are more likely to be alive as of 2007. Education does not seem to matter for mortality since the average years of schooling is around 10.5 years in both samples. Consider measures of health: Average number of doctor visits is 15.3 for the deceased sample but is only 7.5 for the alive sample. 30 percent of the whole sample is chronically ill and 25 percent of the alive sample was chronically ill however this number is 56 percent for the deceased sample. The mortality rate is around 17 percent for the whole sample. Chronic illness is correlated with happiness in 1984 and also will be correlated in later years. Therefore, in the happiness regression in 1984, the paper

controls for the presence of a chronic illness for respondents.[9]

4 Empirical Framework

We employ the estimation strategy used in Oswald and Gardner (2004). We estimate probit models of mortality. Previous research has shown the log odds of mortality to be approximately linear in age for those aged over 30 (Thatcher, 1999): Average age in the whole sample is around 42 in 1984. We also estimate the probit regressions for people older than 40 and the results are quite similar. We also checked the results with the cox proportional hazard model as shown in table 8 and again the results are nearly the same (these results are available upon request.) Mortality is estimated to be a function of self-reported happiness, gender, age, age-square, health status, real household income, marital status, labor force status, and education.

$$Mortality_i^* = Happiness_i + \phi X_i + \xi_i \ ,$$

where $Happiness_i$ is the level of happiness in 1984, the column vector X_i includes individual specific variables, regional dummies, and the unobserved component ξ_i follows a Type 1 extreme value distribution. ϕ is a row vector of coefficients. Marginal probabilities are reported after probit estimations.

[9]See table 3 for the summary statistics of the variables for the 1992 Panel. Table 1 supplies information on the definition of the variables used in the GSOEP.

5 Empirical Results and Robustness

5.1 Does happiness keep people alive?

Tables 4, 5, 6 focus on the influence of individual happiness on mortality which is the main point of the paper. Firstly, we study the role of happiness for the people who were surveyed in 1984 in table 4. The table presents estimates from seven different probit regressions. In the first column, we show that happiness significantly decreases mortality controlling for the years of schooling, log income, marital status and gender. We find that income and being female decreases mortality. An extra year of life increases the probability of death by 1 percent while 1 point increase in log income decreases the probability of death by 2 percent. Females are 5 percent less likely to die. However, we do not find any correlation between education and mortality. Singles are 4 percent more likely to die compared to married people. Next, in column two, we investigate the presence of nonlinearity in education by using highest degree earned as the measure of education. We find that not having either a degree or technical degree significantly decreases mortality by 6 and 7 percent respectively. In the third column, we investigate the role of labor market events on mortality, namely duration of unemployment and employment experienced since 15 years old. We find that employment duration is not significant but unemployment duration since 15 years of age decreases mortality.

Since we claim causality running from happiness to mortality, we control for the presence of *chronic illness* in column four. We find that, even after controlling for the presence of chronic illness in addition to other individual characteristics, happiness in 1984 is still significant in explaining mortality. Having a chronic illness

increases the probability of death by 3 percent which is close to the influence of happiness. We consider annual number of doctor visits as a different measure of health in column 5. We find that ten more doctor visits is associated with 5 percent increase in mortality. The choice of health measures does not seem to matter for the importance (size of the marginal probability) of happiness for mortality. We use the labor market events and health measures together as regressors in columns 6 and 7. In both regressions, again we find that happiness significantly decreases mortality. Presence of chronic illness and annual doctor visits matter for mortality and 10 months more unemployment increases mortality by 3 percent.

Table 5 finds that happiness decreases mortality for people who were surveyed in 1992. An extra year of life increases mortality by 1 percent and 10 more years of schooling is associated with 2 percent decrease in mortality. Rich people and females live longer. Married people significantly live longer and singles appear to have highest mortality. Having no degree significantly decreases mortality. Unlike the regressions in 1984, we find that employment duration significantly decreases mortality however unemployment duration does not matter anymore. We also control for the self-reported health status in columns 5 and 6. After controlling for self-reported health status, we still find that happiness is very significant in explaining mortality, with the same size (3 percent) as in 1984. Having bad health is found to be the strongest predictor for mortality. Having bad health relative to very good health increases mortality by 7 percent. The influence of gender on mortality seems to decrease from 1984 (6 percent) to 1992 (4 percent).

Table 6 considers annual doctor visits and labor market characteristics as additional regressors while examining the influence of happiness on mortality. Employ-

ment duration and annual doctor visits are significantly correlated with mortality. The results suggest that after unification in Germany, happiness and employment became more important for mortality however unemployment duration is not important anymore, and health (annual doctor visit) matters less for mortality. As a result, happiness is found to be robust to the inclusion of different health measures and the influence of happiness appears to be the same in both 1984 and 1992.

5.2 Can happiness overcome chronic illness?

In table 7, we investigate the case of nonlinearity in happiness by using happiness as a categorical variable and importantly, we control for the presence of chronic illness. We also show that happiness is significant in explaining mortality for chronically ill and not chronically ill people separately. However, happiness plays a more important role in decreasing mortality for chronically ill people than for those who are not chronically ill. Consider the marginal probabilities in the second column: having middle happiness (compared to low happiness) decreases mortality by nearly the same amount as chronic illness. Moreover, having high levels of happiness can totally offset the negative influence of chronic illness on mortality. Next, in table 8, we study the influence of happiness on mortality using cox proportional hazard model. Again, we find that happiness decreases mortality controlling for different initial health measures. The results again show that happiness can offset the negative influence of chronic illness on mortality.

5.3 Are recall, expectations, and mortality related?

We investigate channels through which current happiness decreases mortality. Psychology mostly refers to optimism as a source of happiness. We consider recalled happiness and expectations about happiness as indicators of individual optimism. We find in table 9 that in 1984, 10 percent increase in perceived happiness (regarding 1983) and expected happiness (regarding 1985) decrease mortality by 8 percent. In the third column, we use the average of current, perceived and expected happiness as a regressor in order to overcome the possibility that current well-being may be a function of the three satisfaction variables. Column five considers expected happiness concerning the following five years as a regressor for the people surveyed in 1992. Expected happiness concerning the next five years is found to significantly decrease mortality. The results suggest that optimism might be one of the channels through which happiness influences mortality.

5.4 Gender differentials and marriage

We examine gender differentials in mortality in tables 10 and 11. The results show that happiness is more important for men than women in explaining mortality. 1 percent increase in happiness decreases mortality by 5 percent for men. Aging seems to be more important for men. Education is again more important for men in explaining mortality. Men who do not have a degree are 9 percent less likely to die. Consider the marital status: Interestingly, we find that single men are more likely to die than single women. Widowed women live less however being widowed is not important for men. Income has a similar influence on mortality for both

men and women. Health appears to matter more for mortality for men. Men are more likely to be affected by chronic illness than women and 10 more annual doctor visits is associated with 6 percent less mortality for men however this effect is 5 percent for women.

Then, in tables 12 and 13, we explore the gender asymmetries for the people surveyed in 1992. The results show that happiness decreases mortality more for men than women in 1992 as well as in 1984. More educated men live less but education does not explain mortality for women. Again, we find that single men are more likely to have died than single women. Divorced men are 4 percent more likely to have died than married men however being divorced is not found to influence mortality for women. Self-reported health and annual doctor visits are stronger predictors of mortality for men than women. Employment decreases mortality for both men and women but unemployment is important for women.

The findings above suggest that married people significantly live longer than people in other categories of marital status. Tables 14 and 15 investigate possible explanations for this finding. Compare the results in table 14 to the results in table 4: The marginal probabilities of happiness are much bigger in absolute value (more significant as well) which suggest that happiness is more influential in decreasing mortality for the married people. Marriage also seems to lessen the influence of unemployment and the positive impact of education in decreasing mortality is higher for the married people (compared to overall sample). Being female and earning a higher income matters more for mortality for the married people. Chronic illness seems to matter more for the married people however this effect can again be offset by higher happiness. Considering tables 15 and 5, we

again find that happiness matters more for the married people in 1992.

5.5 Parents' longevity and relative status

It is known that many illnesses and individual characteristics are inherited from parents. In table 16, we investigate the impact of parents' longevity on respondent's own mortality. Regression results from 1984 and 1992 show that parent's longevity is important for mortality. The evidence suggests that father's longevity can explain mortality. However, mother's longevity is more important and more significant in explaining mortality.[10] We also consider the role perceptions about relative income and relative status (with respect to neighbors) in explaining mortality in table 17. It has been argued that people with high relative deprivation have a higher probability of death (Miller and Paxson 2005; Eibner and Evans 2005). On the other hand, relative income has been found to be very important for individual happiness (Clark et al. 2008). Recently, Guven and Sorensen (2008) have shown that perceptions about relative income and status also play an important role for individual happiness. Controlling for own income, we find that people who think they have the "same income" relative to neighbors are more likely to have died (relative to "higher income"). Having lower income is not found to be significant relative to higher income in explaining mortality. Having same occupational status relative to neighbors are also found to increase mortality however having lower status does not influence mortality.

[10]The correlation between parents' longevity and mortality can be an indicator of genetic factors as well as other intergenerational transmission mechanisms through income, wealth etc. We do not separate these effects in the paper.

5.6 Robustness

The paper uses the information on respondents who were surveyed in 1984 (the first year of the GSOEP). The paper also presents evidence for the people who were present in 1992 after the German Unification. The number of people in the sample changes and also in 1992 not only West-Germans but also East-Germans were surveyed. Annual number of doctor visits is available for every year in the survey as the health measure. Therefore, the paper uses doctor visits as a measure of health in the regressions. However, the results are robust to the use of different health measures (self-reported health, being disabled, hospital stays, hospital visits, chronic illness). [11] The significance of happiness in explaining mortality declines (but still very significant) once self-reported health is used in the regressions. Because happiness and self-reported health are highly correlated this is what we expect (Self-reported health is found to be a strong predictor of happiness). More objective measures of health (doctor visits, hospital stays) are less correlated with happiness. The results are also robust to the inclusion of the presence of chronic illnesses of the respondents in 1984 (The respondents were asked whether they have any form of chronic illness). The regressions also include state indicators to control for any region specific variables which might affect happiness and mortality together. The correlations among the independent variables are checked for all tables in the paper and none of the correlations between two variables are found to be higher than 0.3.

[11] The results for different health measures are available on request.

6 Conclusion

Individual happiness matters for mortality, even after controlling for various initial health measures of the respondents. People who were happier in 1984 are four percent less likely to have died between 1984 and 2007. Happiness plays a more important role for males than females, for younger people than for older people, and for chronically ill people than for those who are not chronically ill in explaining mortality. The positive influence of happiness on mortality can offset the negative impact of chronic illness. We consider expected and recalled happiness as indicators of optimism, and find that they both can predict mortality. Mother's longevity is significantly and negatively correlated with own mortality. Father's longevity is less important (less significant as well). Controlling for own income, perceptions about income and status relative to neighbors are as important as own income for mortality. Marriage keeps people alive and appears to influence mortality through happiness. We believe that the results of the paper can provide very useful insights for future research on behavioral modeling of the relevant factors for mortality.

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Table 1: **Definition of variables in the GSOEP**

Variable	Definition
age	age of respondent at time of survey in years
chronic illness	whether a person has a chronic illness or not (0-1)
deceased	whether a person deceased or not during 1984-2007 (0-1)
degree	highest degree earned (secondary degree, intermediate degree, technical degree, upper secondary degree, other degree, no degree)
annual doctor visits	individual annual number of doctor visits
education years	number of years of education completed
employment duration since 15	months of employment since 15 years old
expected happiness next year	how satisfied will you be with your life as whole next year? (0-10 where 0=not at all, 10=fully)
expected happiness in 5 years	how satisfied will you be with your life as whole in 5 years? (0-10 where 0=not at all, 10=fully)
gender	gender dummy (1=male, 2=female)
happiness	how satisfied are you with your life as whole? (0-10 where 0=not at all, 10=fully)
log income	real monthly household income
marital status	six categories of marital status (married, separated, single, divorced, widowed, spouse not in Germany)
perceived happiness last year	how satisfied were you with your life as whole last year? (0-10 where 0=not at all, 10=fully)
self-reported health	(5=very good, 4=good) 3=satisfactory, 2=poor, 1=bad)
unemployment duration since 15	months of unemployment since 15 years old

Table 2: **1984: Summary statistics**

Variable	Overall	Living	Deceased
happiness	7.4 (2.1)	7.5 (2.1)	7.3 (2.3)
perceived happiness (last year)	7.3 (2.3)	7.3 (2.2)	7.2 (2.4)
expected happiness (next year)	7.5 (2.1)	7.5 (2.1)	7.1 (2.4)
average happiness	7.4 (2.0)	7.4 (1.9)	7.2 (2.3)
age	42.1 (16.9)	38.1 (14.2)	62.6 (14.4)
log income	7.3 (0.5)	7.3 (0.5)	7.1 (0.6)
children	0.8 (1.1)	0.9 (1.1)	0.3 (0.7)
mother's longevity	69.7 (15.0)	68.9 (15.0)	71.0 (15.0)
father's longevity	64.5 (15.6)	63.5 (15.5)	66.8 (15.7)
average parents' longevity	69.0 (11.2)	68.8 (11.1)	69.4 (11.3)
working full-time	13.5 (12.7)	11.7 (11.5)	22.5 (14.6)
working part-time	1.3 (4.1)	1.2 (3.7)	1.9 (5.5)
not working	0.3 (1.3)	0.3 (1.2)	0.4 (1.6)
married	65.3 (0.4)	65.5 (0.5)	64.3 (1.1)
separated	1.1 (0.1)	1.1 (0.1)	0.9 (0.2)
never married	22.4 (0.4)	25.5 (0.4)	7.2 (0.6)
divorced	3.5 (0.2)	3.4 (0.2)	3.9 (0.4)
widowed	6.7 (0.2)	3.5 (0.2)	23.3 (1.0)
spouse not in Germany	0.9 (0.1)	1.1 (0.1)	0.4 (0.1)
years of education	10.5 (2.3)	10.5 (2.3)	10.5 (1.9)
annual doctor visits	8.8 (16.1)	7.5 (14.5)	15.3 (21.1)
chronically ill	30.7 (0.4)	25.5 (0.5)	56.2 (1.2)
not chronically ill	69.3 (0.4)	74.5 (0.5)	43.8 (1.2)
alive	0.83 (0.1)		
deceased	0.17 (0.1)		
male	49.8 (0.2)	48.4 (0.5)	52.6 (1.1)
female	50.2 (0.2)	51.6 (0.5)	47.4 (1.1)
number of observations	11557	9643	1914

Notes: This table shows the summary statistics of variables for respondents who were surveyed in the GSOEP in 1984. Means are reported for the continuous variables and proportions (for instance, 65.5 is the percentage of married people in 1984 who are still alive in 2007) are reported for categorical variables with the standard deviations in parentheses.

Table 3: **1992: Summary Statistics**

Variable	Overall	Living	Deceased
happiness	6.9 (1.8)	7.0 (1.8)	6.5 (2.1)
expected happiness (in 5 years)	7.1 (1.9)	7.2 (1.9)	6.3 (2.3)
age	43.0 (16.8)	40.3 (15.1)	65.0 (14.6)
log income	7.5 (0.5)	7.5 (0.5)	7.2 (0.6)
children	0.7 (1.0)	0.8 (1.0)	0.2 (0.5)
mother's longevity	69.1 (15.0)	68.7 (15.0)	70.5 (14.8)
father's longevity	63.4 (15.8)	62.8 (15.7)	65.9 (16.0)
average parents' longevity	68.4 (11.4)	68.2 (11.4)	68.8 (11.5)
working full-time	15.1 (13.3)	13.8 (12.6)	25.5 (14.4)
working part-time	1.6 (4.5)	1.5 (4.3)	2.3 (6.1)
not working	0.4 (1.3)	0.4 (1.2)	0.4 (1.6)
married	64.9 (0.4)	65.3 (0.4)	61.5 (1.3)
separated	1.0 (0.1)	1.1 (0.1)	0.8 (0.2)
never married	21.9 (0.4)	23.8 (0.4)	6.1 (0.7)
divorced	5.7 (0.2)	5.6 (0.2)	6.4 (0.7)
widowed	6.2 (0.2)	4.0 (0.2)	25.1 1.2
spouse not in Germany	0.3 (0.1)	0.4 (0.1)	0.1 (0.1)
years of education	11.1 (2.4)	11.1 (2.5)	10.7 (2.0)
doctor visits	11.1 (19.6)	10.0 (17.2)	20.2 (31.8)
self reported health	3.6 (1.0)	3.7 (1.0)	2.7 (1.1)
alive	89.3 (0.3)		
dead	10.7 (0.3)		
male	48.4 (0.4	47.7 (0.5)	53.7 (1.4)
female	51.6 (0.4)	52.3 (0.5)	46.3 (1.4)
number of observations	12592	11239	1353

Notes: This table show the summary statistics of variables for respondents who were surveyed in the GSOEP in 1992. Means are reported for the continuous variables and proportions (for instance, 65.3 is the percentage of married people in 1992 who are still alive in 2007) are reported for categorical variables with the standard deviations in parentheses.

Table 4: **Does happiness keep people alive?: 1984**

Dependent variable:	Whether a person died during 1984-2007 or not						
Regressors (1984)	I	II	III	IV	V	VI	VII
happiness	-0.43 (3.5)	-0.45 (3.7)	-0.45 (3.7)	-0.33 (2.5)	-0.33 (2.6)	-0.34 (2.6)	-0.34 (2.7)
age	0.09 (41.6)	0.08 (39.3)	0.08 (34.1)	0.08 (35.8)	0.08 (38.2)	0.08 (31.4)	0.08 (33.2)
intermediate degree		-0.14 (1.8)	-0.14 (1.8)	-0.15 (1.8)	-0.16 (2.0)	-0.15 (1.8)	-0.16 (2.0)
technical degree		-0.55 (3.1)	-0.55 (3.1)	-0.61 (3.2)	-0.53 (2.9)	-0.61 (3.3)	-0.53 (2.9)
upper secondary degree		-0.22 (2.0)	-0.24 (2.1)	-0.22 (1.9)	-0.22 (1.9)	-0.24 (2.1)	-0.24 (2.1)
other degree		-0.81 (7.5)	-0.80 (7.5)	-0.81 (7.2)	-0.82 (7.5)	-0.80 (7.1)	-0.81 (7.5)
no degree		-0.72 (6.9)	-0.71 (6.8)	-0.70 (6.4)	-0.78 (7.2)	-0.68 (6.2)	-0.78 (7.1)
years of education	0.01 (0.3)						
log income	-0.22 (3.8)	-0.21 (3.7)	-0.21 (3.8)	-0.17 (2.9)	-0.19 (3.3)	-0.17 (3.0)	-0.20 (3.4)
separated	0.23 (0.9)	0.22 (0.9)	0.22 (0.9)	0.17 (0.7)	0.22 (0.9)	0.18 (0.7)	0.23 (0.9)
single	0.44 (4.5)	0.36 (3.8)	0.36 (3.8)	0.39 (3.9)	0.37 (3.8)	0.39 (3.9)	0.39 (3.8)
divorced	0.18 (1.3)	0.12 (0.9)	0.13 (1.0)	0.07 (0.5)	0.11 (0.8)	0.08 (0.6)	0.12 (0.9)
widowed	0.19 (2.0)	0.16 (1.7)	0.15 (1.6)	0.21 (2.1)	0.14 (1.5)	0.19 (2.0)	0.13 (1.4)
spouse not in Germany	-0.78 (2.5)	-0.23 (0.8)	-0.24 (0.8)	-0.30 (0.9)	-0.18 (0.6)	-0.30 (0.9)	-0.18 (0.6)
female	-0.54 (9.3)	-0.58 (10.1)	-0.59 (8.5)	-0.59 (10.1)	-0.60 (10.5)	-0.62 (8.6)	-0.62 (8.9)
unemployment duration since 15			0.03 (1.6)			0.04 (1.9)	0.03 (1.7)
employment duration since 15			0.01 (0.3)			0.01 (0.6)	0.01 (0.4)
no chronic illness				-0.33 (5.6)		-0.33 (5.6)	
doctor visits					0.05 (3.7)		0.05 (3.7)
number of observations	11061	11061	11041	10369	10814	10352	10797
pseudo r-squared	0.35	0.36	0.36	0.37	0.37	0.37	0.37

Notes: Regression of mortality on individual characteristics and happiness in 1984. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Happiness takes values 0-10, where 0 is totally unhappy and 10 is totally happy. Log income is the log of real monthly household income. Secondary degree, married, have chronic illness, and male are omitted categories.

Table 5: **Does happiness keep people alive?: 1992**

Dependent variable:	Whether a person died during 1992-2007 or not					
Regressors (1992)	I	II	III	IV	V	VI
happiness	-0.63 (7.1)	-0.63 (7.1)	-0.64 (7.1)	-0.63 (7.1)	-0.30 (3.1)	-0.28 (2.8)
age	0.05 (35.5)	0.05 (34.4)	0.05 (32.7)	0.05 (31.9)	0.05 (30.9)	0.05 (29.8)
intermediate degree		-0.08 (1.8)		-0.08 (1.9)		-0.05 (1.2)
technical degree		-0.45 (3.1)		-0.45 (3.2)		-0.46 (3.2)
upper secondary degree		-0.19 (3.1)		-0.22 (3.4)		-0.17 (2.6)
other degree		-0.35 (4.8)		-0.36 (4.8)		-0.37 (5.2)
no degree		-0.20 (2.6)		-0.21 (2.7)		-0.25 (3.2)
years of education	-0.02 (2.9)		-0.02 (3.0)		-0.02 (2.0)	
log income	-0.09 (2.6)	-0.07 (2.1)	-0.10 (2.9)	-0.08 (2.3)	-0.10 (2.9)	-0.09 (2.4)
separated	-0.02 (0.1)	-0.02 (0.1)	0.02 (0.1)	0.02 (0.1)	0.03 (0.1)	0.02 (0.2)
single	0.32 (5.0)	0.32 (5.0)	0.32 (4.9)	0.32 (4.9)	0.30 (4.7)	0.29 (4.6)
divorced	0.14 (2.1)	0.14 (2.0)	0.17 (2.4)	0.16 (2.4)	0.14 (2.0)	0.13 (1.9)
widowed	0.14 (2.6)	0.15 (2.5)	0.11 (1.9)	0.10 (1.8)	0.16 (2.9)	0.15 (2.7)
spouse not in Germany	-0.81 (2.1)	-0.55 (1.5)	-0.80 (2.1)	-0.55 (1.4)	-0.78 (2.1)	-0.51 (1.4)
female	-0.39 (10.7)	-0.39 (10.9)	-0.47 (11.0)	-0.48 (11.2)	-0.40 (10.8)	-0.40 (11.2)
unemployment duration since 15			0.02 (1.7)	0.01 (0.9)		
employment duration since 15			-0.06 (3.7)	-0.06 (3.9)		
good health					0.02 (0.2)	0.02 (0.3)
satisfactory health					0.12 (1.6)	0.13 (1.8)
poor health					0.20 (2.4)	0.23 (2.8)
bad health					0.67 (6.9)	0.71 (7.4)
annual doctor visits						
number of observations	12120	12120	12058	12058	12106	12106
pseudo r-squared	0.33	0.33	0.33	0.33	0.34	0.34

Notes: Regression of mortality on individual characteristics and happiness in 1992. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Happiness takes values 0-10, where 0 is totally unhappy and 10 is totally happy. Log income is the log of real monthly household income. Secondary degree, married, very good health, and male are omitted categories.

Table 6: **Does happiness keep people alive?: 1992 continued**

Dependent variable:	Whether a person died during 1992-2007 or not					
Regressors (1992)	I	II	III	IV	V	VI
happiness	-0.55 (6.1)	-0.54 (6.0)	-0.31 (3.1)	-0.29 (2.9)	-0.56 (6.1)	-0.55 (6.1)
age	0.05 (34.4)	0.05 (33.4)	0.05 (28.5)	0.05 (27.7)	0.05 (31.7)	0.05 (30.9)
intermediate degree		-0.08 (1.7)		-0.06 (1.3)		-0.08 (1.8)
technical degree		-0.05 (3.2)		-0.05 (3.2)		-0.05 (3.2)
upper secondary degree		-0.19 (2.9)		-0.18 (2.8)		-0.21 (3.3)
other degree		-0.38 (4.9)		-0.36 (5.1)		-0.38 (4.9)
no degree		-0.22 (2.8)		-0.25 (3.2)		-0.23 (2.9)
years of education	-0.02 (2.6)		-0.02 (2.1)		-0.02 (2.7)	
log income	-0.09 (2.8)	-0.08 (2.3)	-0.11 (3.2)	-0.09 (2.6)	-0.11 (3.1)	-0.09 (2.5)
separated	0.01 (0.0)	0.01 (0.2)	0.01 (0.1)	0.01 (0.1)	0.01 (0.1)	0.01 (0.2)
single	0.32 (5.0)	0.32 (5.0)	0.30 (4.6)	0.29 (4.6)	0.32 (4.9)	0.31 (4.9)
divorced	0.13 (1.8)	0.12 (1.8)	0.16 (2.2)	0.15 (2.2)	0.16 (2.1)	0.14 (2.1)
widowed	0.16 (2.8)	0.15 (2.7)	0.13 (2.2)	0.12 (2.1)	0.11 (2.1)	0.11 (2.0)
spouse not in Germany	-0.77 (2.0)	-0.51 (1.4)	-0.78 (2.0)	-0.51 (1.3)	-0.77 (2.0)	-0.51 (1.3)
female	-0.40 (10.8)	-0.40 (11.1)	-0.47 (10.9)	-0.48 (11.2)	-0.48 (11.1)	-0.48 (11.3)
unemployment duration since 15			0.02 1.8	0.01 1.0	0.02 1.8	0.01 1.0
employment duration since 15			-0.05 (3.1)	-0.05 (3.2)	-0.05 (3.5)	0.06 (3.7)
good health			0.22 (0.3)	0.27 (0.4)		
satisfactory health			0.12 (1.7)	0.13 (1.8)		
poor health			0.20 (2.5)	0.23 (2.8)		
bad health			0.67 (6.9)	0.71 (7.3)		
annual doctor visits	0.04 (6.1)	0.04 (6.4)			0.04 (6.0)	0.04 (6.2)
number of observations	12120	12120	12044	12044	12058	12058
pseudo r-squared	0.33	0.34	0.34	0.35	0.33	0.34

Notes: Regression of mortality on individual characteristics and happiness in 1992. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Happiness takes values 0-10, where 0 is totally unhappy and 10 is totally happy. Log income is the log of real monthly household income. Secondary degree, married, very good health, and male are omitted categories.

Table 7: **Happiness as a categorical variable and chronic illness**

Dependent variable:	Whether a person died during 1984-2007 or not			
	1984	1984	chronically ill 1984	not chronically ill 1984
middle happiness	-0.34 (3.4)	-0.27 (2.8)	-0.40 (1.6)	-0.26 (2.5)
high happiness	-0.42 (4.4)	-0.32 (3.2)	-0.72 (2.7)	-0.24 (2.3)
no chronic illness		-0.28 (5.0)		
number of observations	11041	10369	3187	7168
pseudo r-squared	0.38	0.39	0.34	0.36

Notes: Regression of mortality on individual characteristics and happiness. The original happiness variable is a categorical variable taking values from 0 to 10. Happiness is recoded here as follows: (0-1-2-3-4) low, (5-6-7) middle, and (8-9-10) high. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality and multiplied by 10. Log income is the log of real monthly household income. Controls for every regression are: Labor force status, marital and health status, log income, gender, age, education, duration of employment since 15 and duration of unemployment since 15. Low happiness is the omitted category.

Table 8: **Does happiness keep people alive?: Cox hazard model**

	1984	1984	1984	1992	1992	1992	1992
	I	II	III	IV	V	VI	VII
self-reported happiness	-0.97 (3.3)			-0.91 (7.1)		-0.96 (2.9)	
middle happiness		-0.80 (2.8)	-0.75 (3.3)		-0.69 (4.4)		-0.86 (1.8)
high happiness		-0.75 (3.4)	-0.73 (3.7)		-0.58 (6.2)		-0.83 (2.1)
no chronic illness			-0.71 (6.5)				
annual doctor visits	1.00 (4.8)	1.00 (4.7)		1.00 (7.5)	1.00 (7.9)		
self-reported health						1.38 (9.6)	
good health							1.21 (1.1)
satisfactory health							1.63 (3.0)
poor health							2.02 (4.1)
bad health							3.77 (7.4)
number of observations	10794	10794	10349	12102	12102	12088	12088

Notes: Regression of mortality on individual characteristics and happiness in 1984. The regressions are estimated with cox proportional hazard model. Hazard ratios are reported with t-statistics in parentheses. The original happiness variable is a categorical variable taking values from 0 to 10. Happiness is recoded here as follows: (0-1-2-3-4) low, (5-6-7) middle, and (8-9-10) high. Self reported health status takes values 1-5 (5=very good, 4=good, 3=satisfactory, 2=poor, 1=bad) and treated as a continuous variable in column 6. Log income is the log of real monthly household income. Controls for every regression are: Labor force status, marital and health status, log income, gender, age, education, duration of employment since 15 and duration of unemployment since 15. Very good health, low happiness, and have chronic illness are omitted categories.

Table 9: **Perceived happiness, expected happiness, and mortality**

Dependent variable:	Whether a person died during 1984 (1992)-2007 or not			
	1984	1984	1984	1992
	I	II	III	IV
expected happiness next year	-0.78 (2.7)			
perceived happiness last year		-0.82 (2.9)		
average happiness			-0.85 (2.7)	
expected happiness in 5 years				-0.32 (3.8)
age	0.19 (27.8)	0.19 (28.0)	0.19 (27.8)	0.05 (29.9)
intermediate degree	-0.24 (1.3)	-0.22 (1.2)	-0.24 (1.3)	-0.06 (1.4)
technical degree	-1.03 (2.4)	-1.05 (2.5)	-1.03 (2.4)	-0.47 (3.1)
upper secondary degree	-0.84 (2.9)	-0.86 (2.9)	-0.85 (2.9)	-0.20 (3.0)
other degree	-1.85 (6.8)	-1.82 (6.8)	-1.86 (6.8)	-0.36 (4.8)
no degree	-1.74 (6.9)	-1.76 (6.9)	-1.75 (6.9)	-0.22 (2.7)
unemployment duration since 15	-0.05 (1.4)	-0.05 (1.4)	-0.05 (1.4)	-0.01 (1.1)
employment duration since 15	-0.01 (0.2)	-0.02 (0.3)	-0.01 (0.2)	-0.05 (3.3)
annual doctor visits	0.10 (3.3)	0.11 (3.5)	0.10 (3.3)	0.04 (6.4)
log income	-0.33 (2.4)	-0.33 (2.4)	-0.33 (2.4)	-0.12 (3.4)
separated	0.22 0.3	0.20 0.3	0.15 0.2	0.04 0.2
single	0.27 (0.9)	0.22 (0.7)	0.27 (0.9)	0.31 (4.8)
divorced	0.24 (0.7)	0.22 (0.7)	0.22 (0.7)	0.15 (2.1)
widowed	0.11 (0.5)	0.11 (0.5)	0.10 (0.5)	0.10 (1.7)
spouse not in Germany	-0.68 (0.9)	-0.75 (1.0)	-0.70 (1.0)	-0.50 (1.3)
female	-1.51 (8.5)	-1.53 (8.7)	-1.51 (8.5)	-0.47 (10.9)
number of observations	5604	5663	5604	11903
pseudo r-squared	0.27	0.27	0.27	0.33

Notes: Regression of mortality on individual characteristics and expected or perceived happiness in 1984 and 1992. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Expected happiness next year, expected happiness in 5 years and perceived happiness last year takes values 0-10, where 0 is totally unhappy and 10 is totally happy. Average happiness is the average of expected happiness next year, current happiness and perceived happiness last year. Log income is the log of real monthly household income. Secondary degree, married and male are omitted categories.

Table 10: **Happiness and mortality: Male in 1984**

Dependent variable:	Whether a person died during 1984-2007 or not					
Regressors (1984)	I	II	III	IV	V	VI
happiness	-0.61 (3.2)	-0.61 (3.1)	-0.45 (2.2)	-0.52 (2.6)	-0.44 (2.1)	-0.51 (2.5)
age	0.11 (28.8)	0.11 (20.6)	0.10 (26.3)	0.10 (28.0)	0.11 (19.1)	0.11 (20.0)
intermediate degree	-0.21 (1.5)	-0.23 (1.7)	-0.22 (1.5)	-0.18 (1.3)	-0.24 (1.7)	-0.21 (1.5)
technical degree	-0.68 (2.7)	-0.71 (2.8)	-0.79 (3.0)	-0.64 (2.5)	-0.82 (3.1)	-0.67 (2.6)
upper secondary degree	-0.22 (1.5)	-0.31 (1.9)	-0.24 (1.5)	-0.18 (1.1)	-0.33 (2.0)	-0.27 (1.6)
other degree	-0.84 (5.9)	-0.85 (5.9)	-0.86 (5.6)	-0.86 (5.9)	-0.86 (5.6)	-0.87 (5.9)
no degree	-0.86 (5.4)	-0.86 (5.3)	-0.82 (4.9)	-0.92 (5.5)	-0.81 (4.8)	-0.92 (5.4)
log income	-0.19 (2.0)	-0.19 (2.0)	-0.17 (1.7)	-0.19 (2.1)	-0.17 (1.7)	-0.19 (2.0)
separated	0.27 (0.7)	0.27 (0.7)	0.31 (0.8)	0.25 (0.6)	0.31 (0.8)	0.26 (0.7)
single	0.53 (3.5)	0.49 (3.2)	0.60 (3.8)	0.55 (3.6)	0.55 (3.4)	0.50 (3.2)
divorced	0.25 (1.0)	0.26 (1.1)	0.21 (0.8)	0.23 (0.9)	0.22 (0.8)	0.24 (1.0)
widowed	0.21 (0.9)	0.19 (0.8)	0.23 (1.0)	0.22 (0.9)	0.22 (0.9)	0.20 (0.8)
spouse not in Germany	-0.19 (0.5)	-0.19 (0.5)	-0.28 (0.7)	-0.13 (0.4)	-0.28 (0.7)	-0.14 (0.4)
unemployment duration since 15		-0.03 (0.8)			-0.03 (0.9)	-0.02 (0.6)
employment duration since 15		-0.09 (1.5)			-0.09 (1.4)	-0.09 (1.4)
no chronic illness			-0.37 (3.8)		-0.37 (3.9)	
annual doctor visits				0.06 (2.5)		0.06 (2.5)
number of observations	5443	5433	5092	5311	5084	5303
pseudo r-squared	0.35	0.35	0.35	0.35	0.35	0.35

Notes: Regression of mortality on individual characteristics and happiness in 1984 for males. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Happiness takes values 0-10, where 0 is totally unhappy and 10 is totally happy. Log income is the log of real monthly household income. Secondary degree, married, and have chronic illness are omitted categories.

Table 11: **Happiness and mortality: Female in 1984**

Dependent variable:	Whether a person died during 1984-2007 or not					
Regressors (1984)	I	II	III	IV	V	VI
happiness	-0.31 (2.0)	-0.31 (2.0)	-0.22 (1.3)	-0.18 (1.1)	-0.23 (1.4)	-0.18 (1.1)
age	0.07 (26.1)	0.07 (25.0)	0.07 (23.8)	0.07 (25.3)	0.07 (22.9)	0.07 (24.4)
intermediate degree	-0.01 (1.1)	-0.01 (1.1)	-0.01 (1.0)	-0.01 (1.4)	-0.01 (1.0)	-0.01 (1.5)
technical degree	-0.40 (1.4)	-0.39 (1.3)	-0.35 (1.2)	-0.38 (1.3)	-0.34 (1.2)	-0.38 (1.3)
upper secondary degree	-0.28 (1.6)	-0.29 (1.6)	-0.25 (1.4)	-0.33 (1.8)	-0.25 (1.4)	-0.34 (1.9)
other degree	-0.90 (4.5)	-0.90 (4.5)	-0.85 (4.3)	-0.86 (4.5)	-0.85 (4.3)	-0.86 (4.4
no degree	-0.61 (4.4)	-0.60 (4.4)	-0.59 (4.2)	-0.65 (4.7)	-0.58 (4.1)	-0.64 (4.6)
log income	-0.22 (3.2)	-0.23 (3.2)	-0.18 (2.5)	-0.19 (2.7)	-0.18 (2.5)	-0.19 (2.8)
separated	0.15 (0.4)	0.15 (0.4)	0.01 (0.2)	0.18 (0.5)	0.01 (0.2)	0.18 (0.5)
single	0.29 (2.2)	0.31 (2.3)	0.27 (2.0)	0.28 (2.2)	0.30 (2.2)	0.30 (2.3)
divorced	0.06 (0.4)	0.07 (0.5)	0.01 (0.1)	0.05 (0.3)	0.06 (0.1)	0.01 (0.4)
widowed	0.19 (1.9)	0.19 (1.9)	0.22 (2.2)	0.16 (1.6)	0.22 (2.1)	0.16 (1.6)
unemployment duration since 15		-0.03 1.6			-0.04 1.9	-0.04 1.9
employment duration since 15		-0.01 (0.3)			-0.01 (0.4)	-0.01 (0.1)
no chronic illness			-0.31 (4.1)		-0.30 (4.1)	
annual doctor visits				0.04 (2.7)		0.05 (2.8)
number of observations	5602	5592	5261	5487	5252	5478
pseudo r-squared	0.38	0.38	0.38	0.38	0.38	0.38

Notes: Regression of mortality on individual characteristics and happiness in 1984 for females. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Happiness takes values 0-10, where 0 is totally unhappy and 10 is totally happy. Log income is the log of real monthly household income. Secondary degree, married, and have chronic illness are omitted categories.

Table 12: **Happiness and mortality: Male in 1992**

Dependent variable:	Whether a person died during 1992-2007 or not					
Regressors (1992)	I	II	III	IV	V	VI
happiness	-1.01 (6.5)	-1.03 (6.4)	-0.54 (3.2)	-0.92 (5.9)	-0.56 (3.2)	-0.94 (5.8)
age	0.06 (26.3)	0.08 (21.3)	0.06 (22.4)	0.06 (25.3)	0.07 (18.5)	0.06 (20.5)
years of education	-0.03 (2.6)	-0.04 (3.3)	-0.02 (1.7)	-0.03 (2.3)	-0.03 (2.3)	-0.04 (3.0)
log income	-0.13 (2.1)	-0.15 (2.3)	-0.16 (2.5)	-0.14 (2.2)	-0.17 (2.6)	-0.16 (2.4)
separated	0.15 (0.6)	0.11 (0.4)	0.14 (0.5)	0.16 (0.6)	0.11 (0.4)	0.12 (0.5)
single	0.05 (4.5)	0.04 (3.6)	0.04 (4.0)	0.05 (4.4)	0.04 (3.3)	0.04 (3.5)
divorced	0.49 (3.2)	0.41 (3.1)	0.44 (3.1)	0.48 (3.0)	0.37 (3.0)	0.40 (2.9)
widowed	0.41 (2.0)	0.41 (1.6)	0.39 (2.2)	0.39 (2.2)	0.40 (1.8)	0.39 (1.9)
spouse not in Germany	0.29 (2.0)	0.25 (2.1)	0.31 (1.9)	0.32 (1.9)	0.27 (2.0)	0.18 (2.0)
unemployment duration since 15		-0.02 (1.0)			-0.02 (1.2)	-0.02 (1.0)
employment duration since 15		-0.17 (4.1)			-0.15 (3.5)	-0.16 (3.8)
good health			0.02 (0.1)		0.03 (0.3)	
satisfactory health			0.23 (1.9)		0.25 (2.1)	
poor health			0.30 (2.2)		0.32 (2.3)	
bad health			0.99 (6.0)		1.00 (5.8)	
annual doctor visits				0.05 (4.6)		0.05 (4.3)
number of observations	5889	5857	5883	5889	5851	5857
pseudo r-squared	0.32	0.32	0.33	0.32	0.33	0.32

Notes: Regression of mortality on individual characteristics and happiness in 1992 for males. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Happiness takes values 0-10, where 0 is totally unhappy and 10 is totally happy. Log income is the log of real monthly household income. Married and very good health are omitted categories.

Table 13: **Happiness and mortality: Female in 1992**

Dependent variable:	Whether a person died during 1992-2007 or not					
Regressors (1992)	I	II	III	IV	V	VI
happiness	-0.36 (3.5)	-0.38 (3.6)	-0.13 (1.1)	-0.28 (2.6)	-0.14 (1.2)	-0.30 (2.80)
age	0.04 (23.3)	0.04 (23.1)	0.04 (20.9)	0.04 (22.8)	0.04 (20.6)	0.04 (22.5)
years of education	-0.01 (1.3)	-0.01 (1.2)	-0.01 (1.0)	-0.01 (1.2)	-0.01 (0.9)	-0.01 (1.1)
log income	-0.07 (1.8)	-0.08 (2.0)	-0.08 (2.0)	-0.08 (2.0)	-0.09 (2.2)	-0.09 (2.1)
separated	-0.41 (1.1)	-0.43 (1.1)	-0.43 (1.1)	-0.40 (1.1)	-0.44 (1.1)	-0.42 (1.1)
single	0.22 (2.7)	0.25 (3.0)	0.22 (2.5)	0.23 (2.7)	0.24 (2.8)	0.25 (3.0)
divorced	0.01 (0.1)	0.03 (0.5)	0.01 (0.1)	-0.01 (0.1)	0.03 (0.4)	0.02 (0.3)
widowed	0.11 (1.9)	0.10 (1.7)	0.11 (2.0)	0.11 (2.0)	0.10 (1.7)	0.10 (1.7)
unemployment duration since 15		-0.03 (2.1)			-0.03 (2.1)	-0.04 (2.2)
employment duration since 15		-0.03 (2.0)			-0.03 (1.7)	-0.03 (1.9)
good health			0.01 (0.1)		0.01 (0.1)	
satisfactory health			0.01 (0.2)		0.01 (0.2)	
poor health			0.01 (0.9)		0.01 (0.9)	
bad health			0.43 (3.6)		0.43 (3.6)	
annual doctor visits				0.03(4.1)		0.03 (4.1)
number of observations	6219	6189	6211	6219	6181	6189
pseudo r-squared	0.34	0.35	0.35	0.35	0.35	0.35

Notes: Regression of mortality on individual characteristics and happiness in 1992 for females. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Happiness takes values 0-10, where 0 is totally unhappy and 10 is totally happy. Log income is the log of real monthly household income. Married and very good health are omitted categories.

Table 14: **Why do married people live longer?: 1984**

Dependent variable:	Whether a person died during 1984-2007 or not					
Regressors (1984)	I	II	III	IV	V	VI
happiness	-0.60 (3.7)	-0.60 (3.7)	-0.42 (2.5)	-0.44 (2.7)	-0.42 (2.5)	-0.44 (2.7)
age	0.09 (32.6)	0.09 (28.5)	0.09 (29.3)	0.09 (31.5)	0.09 (25.9)	0.09 (27.7)
intermediate degree	-0.14 (1.3)	-0.14 (1.3)	-0.14 (1.2)	-0.14 (1.3)	-0.13 (1.2)	-0.14 (1.3)
technical degree	-0.43 (1.9)	-0.43 (1.9)	-0.52 (2.3)	-0.40 (1.8)	-0.52 (2.3)	-0.40 (1.8)
upper secondary degree	-0.14 (1.0)	-0.14 (0.9)	-0.15 (1.0)	-0.10 (0.7)	-0.15 (1.0)	-0.10 (0.7)
other degree	-0.89 (7.0)	-0.89 (7.0)	-0.92 (6.8)	-0.91 (7.0)	-0.91 (6.8)	-0.91 (7.0)
no degree	-0.83 (6.5)	-0.82 (6.4)	-0.83 (6.2)	-0.91 (6.9)	-0.81 (6.1)	-0.90 (6.8)
log income	-0.27 (3.4)	-0.28 (3.5)	-0.25 (3.0)	-0.25 (3.1)	-0.25 (3.0)	-0.26 (3.2)
female	-0.60 (8.6)	-0.59 (6.0)	-0.60 (8.4)	-0.62 (8.8)	-0.60 (6.1)	-0.61 (6.3)
unemployment duration since 15		-0.01 (0.5)			-0.02 (0.7)	-0.01 (0.4)
employment duration since 15		0.01 (0.3)			0.01 (0.1)	0.01 (0.2)
no chronic illness			-0.37 (5.0)		-0.37 (5.0)	
annual doctor visits				0.06 (3.1)		0.06 (3.1)
number of observations	7217	7208	6759	7065	6751	7056
pseudo r-squared	0.32	0.32	0.31	0.32	0.32	0.32

Notes: Regression of mortality on individual characteristics and happiness in 1984 for married people. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Happiness takes values 0-10, where 0 is totally unhappy and 10 is totally happy. Log income is the log of real monthly household income. Secondary degree and have chronic illness are omitted categories.

Table 15: **Why do married people live longer?: 1992**

Dependent variable:	Whether a person died during 1992-2007 or not					
Regressors (1992)	I	II	III	IV	V	VI
happiness	-0.73 (6.1)	-0.75 (6.2)	-0.36 (2.8)	-0.65 (5.3)	-0.37 (2.8)	-0.66 (5.4)
age	0.05 (27.7)	0.05 (26.0)	0.05 (23.9)	0.05 (26.7)	0.05 (22.5)	0.05 (25.1)
intermediate degree	-0.08 (1.4)	-0.09 (1.5)	-0.05 (0.9)	-0.07 (1.3)	-0.06 (1.0)	-0.08 -1.4
technical degree	-0.47 (2.4)	-0.48 (2.5)	-0.46 (2.4)	-0.46 (2.4)	-0.47 (2.5)	-0.47 (2.5)
upper secondary degree	-0.23 (2.8)	-0.25 (3.0)	-0.20 (2.4)	-0.22 (2.6)	-0.22 (2.6)	-0.24 (2.9)
other degree	-0.46 (5.0)	-0.48 (5.2)	-0.50 (5.4)	-0.47 (5.1)	-0.52 (5.6)	-0.50 (5.3)
no degree	-0.31 (3.1)	-0.33 (3.2)	-0.37 (3.6)	-0.33 (3.3)	-0.38 (3.7)	-0.35 (3.4)
log income	-0.10 (2.1)	-0.11 (2.1)	-0.12 (2.3)	-0.11 (2.2)	-0.12 (2.3)	-0.11 (2.2)
female	-0.38 (8.3)	-0.48 (8.3)	-0.40 (8.7)	-0.39 (8.5)	-0.49 (8.3)	-0.49 (8.4)
unemployment duration since 15		0.01 (0.3)			0.01 (0.2)	0.01 (0.1)
employment duration since 15		-0.07 (2.9)			-0.06 (2.5)	-0.07 (2.9)
good health			-0.07 (0.7)		-0.07 (0.7)	
satisfactory health			0.04 (0.4)		0.04 (0.4)	
poor health			0.19 (1.8)		0.19 (1.7)	
bad health			0.71 (5.5)		0.71 (5.5)	
annual doctor visits				0.04 (4.9)		0.04 (4.8)
number of observations	7883	7839	7874	7883	7830	7839
pseudo r-squared	0.27	0.27	0.29	0.28	0.29	0.28

Notes: Regression of mortality on individual characteristics and happiness in 1992 for married people. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Happiness takes values 0-10, where 0 is totally unhappy and 10 is totally happy. Log income is the log of real monthly household income. Secondary degree and very good health are omitted categories.

Table 16: **Parents' longevity and mortality**

Dependent variable:	Whether a person died during 1984 (1992)-2007 or not					
	1984	1984	1984	1992	1992	1992
	I	II	III	IV	V	VI
happiness	-1.07 (2.2)	-1.08 (2.0)	-1.25 (2.2)	-1.18 (4.6)	-1.68 (4.7)	-1.71 (3.8)
age	0.26 (22.5)	0.27 (21.1)	0.28 (19.9)	0.12 (24.6)	0.16 (22.5)	0.20 (20.6)
intermediate degree	-0.48 (1.7)	-0.67 (2.1)	-0.69 (2.1)	-0.16 (0.1)	-0.16 (0.9)	-0.16 (0.7)
technical degree	-1.58 (2.5)	-1.46 (2.1)	-1.35 (1.9)	-1.24 (3.0)	-1.40 (2.5)	-1.57 (2.3)
upper secondary degree	-1.16 (2.8)	-1.13 (2.4)	-1.17 (2.4)	-0.47 (2.6)	-0.71 (2.6)	-0.77 (2.2)
other degree	-1.25 (0.7)			0.36 (0.7)	-0.67 (0.1)	-0.36 (0.4)
no degree	-1.16 (0.8)	-0.67 (0.4)	-1.26 (0.7)	-0.72 (1.0)	-0.51 (0.6)	-2.23 (1.6)
unemployment duration since 15	0.02 (0.3)	0.02 (0.2)	0.02 (0.3)	0.02 (0.1)	-0.02 (0.5)	-0.02 (0.4)
employment duration since 15	-0.01 (0.1)	0.03 (0.3)	0.04 (0.4)	-0.10 (2.5)	-0.09 (1.6)	-0.12 (1.7)
annual doctor visits	0.12 (2.4)	0.14 (2.6)	0.15 (2.5)	0.10 (5.3)	0.14 (5.1)	0.16 (4.6)
log income	-0.32 (1.5)	-0.37 (1.6)	-0.30 (1.2)	-0.11 (1.1)	-0.28 (1.9)	-0.26 (1.4)
separated	1.17 (0.9)	1.31 (0.9)	-0.15 (0.1)	0.07 (0.1)	-0.07 (0.1)	0.05 (0.1)
single	0.72 (1.6)	0.44 (0.8)	0.54 (1.0)	0.47 (2.1)	0.59 (1.8)	0.77 (1.8)
divorced	0.65 (1.4)	0.72 (1.3)	0.57 (1.0)	0.36 (1.8)	0.39 (1.3)	0.36 (1.0)
widowed	0.27 (0.9)	0.98 (0.3)	0.97 (0.3)	0.24 (1.7)	0.26 (1.3)	0.27 (1.1)
female	-1.95 (7.1)	-1.95 (6.3)	-1.91 (5.8)	-1.11 (8.9)	-1.36 (7.7)	-1.65 (7.3)
father's longevity	-0.12 (1.8)			-0.05 (1.7)		
mother's longevity		-0.16 (2.1)			-0.16 (3.3)	
parents' average longevity			-0.29 (2.7)			-0.25 (3.3)
number of observations	2900	2417	2197	4804	3551	2866
pseudo r-squared	0.25	0.25	0.3	0.29	0.27	0.24

Notes: Regression of mortality on individual characteristics and mother's longevity, father's longevity and the average parents' longevity in 1984 and 1992. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness, employment duration since 15 and doctor visits are multiplied by 100. Marginal probabilities of other independent variables are multiplied by 10. Average longevity is the average of father's longevity and mother's longevity. Log income is the log of real monthly household income. Secondary degree, married and male are omitted categories.

Table 17: **The role of perceived relative income and status**

Dependent variable:	Whether a person died during 1984-2007 or not		
	I	II	III
happiness	-0.61 (3.5)	-0.64 (3.6)	-0.61 (3.5)
log income	-0.25 (3.4)	-0.24 (3.1)	-0.17 (2.4)
perceived relative income:			
same with neighbors'		0.27 (2.4)	
lower than neighbors'		0.08 (0.7)	
perceived occupational status:			
same with neighbors'			0.28 (2.6)
lower than neighbors'			0.13 (1.0)
number of observations	6721	6721	6681
pseudo r-squared	0.37	0.37	0.37

Notes: Regression of mortality on individual characteristics and perceptions about income and occupational status relative to neighbors. The regressions are estimated with probit model. Marginal probabilities are reported with t-statistics in parentheses. Marginal probability is the effect of a one unit increase in the independent variable on the predicted probability of the mortality. Marginal probabilities of happiness is multiplied by 100 and marginal probabilities of log income, perceived relative income, and perceived occupational status are multiplied by 10. Log income is the log of real monthly household income. Higher income than neighbors' and higher occupational status than neighbors' are omitted categories. Controls for every regression are: Labor force status, marital and health status, log income, gender, age, education, duration of employment since 15 and duration of unemployment since 15.