

Long-running German panel survey shows that personal and economic choices, not just genes, matter for happiness

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Psychologists and economists take contradictory approaches to research on what psychologists call happiness or subjective well-being, and economists call subjective utility. A direct test of the most widely accepted psychological theory, set-point theory, shows it to be flawed. Results are then given, using the economists' newer "choice approach"—an approach also favored by positive psychologists—which yields substantial payoffs in explaining long-term changes in happiness. Data come from the German Socio-Economic Panel (1984–2008), a unique 25-y prospective longitudinal survey. This dataset enables direct tests of theories explaining long-term happiness.

German Socio-Economic Panel | set-point theory | subjective utility

Research on life satisfaction or happiness used to be a minor branch of psychology, became a major branch, and then in the past decade has attracted huge interest among economists. Some of these economists now use satisfaction measures as proxies for the outcome which economic agents are assumed to maximize—namely, individual utility (1–4). But the assumptions and findings of psychologists and economists are contradictory. The dominant theory in psychology is probably still set-point theory, although authentic happiness theory, developed by positive psychologists, is increasingly influential (5–7). Set-point theory holds that long-term adult happiness is stable—it has a set-point—because it depends mainly on genetic factors, including personality traits molded and expressed early in life (8–10). It has been shown that major life events can temporarily change happiness levels, but that most people revert to their previous set-point within a year or two (8, 11). The theory can be summarized by saying that, “We are all on a hedonic treadmill” (8). An obvious implication is that neither individual choices nor public policy can make a substantial long-term difference to happiness.

Economists who, following the recent advice of the Commission on the Measurement of Economic Performance and Social Progress (12), now intend to use direct satisfaction-based measures of utility must necessarily assume the opposite. There is no point in deploying such measures if individual preferences, behavioral choices, and public policy could not increase long-term satisfaction. If satisfaction levels are unresponsive to changes in behavior or policy interventions, then economists would do better to stick to their mainstream revealed-preferences approach of measuring utility indirectly by observing consumption and leisure choices (13). A recent paper by Oswald and Wu (14) shows plausible cross-sectional associations between objective social and economic conditions and subjective reports of happiness, but, so far as we know, no previous paper has shown that preferences and behavioral choices can produce long-term change.

This article reports a direct test of set-point theory, and also shows substantial effects of personal and economic preferences and choices on long-term life satisfaction. A direct test of set-point theory requires longitudinal evidence—long-run data on life satisfaction/happiness. The German Socio-Economic Panel Survey (SOEP) provides by far the longest data series available

worldwide. It reports interviews with a very large national representative sample aged 16 and over, who have answered questions about their life satisfaction every year from 1984 to 2008 (15). During this quarter-century, large numbers of respondents recorded substantial and apparently permanent changes in satisfaction. As will become clear, the scale of change indicates that set-point theory is seriously flawed.

A key implication is that the economist's goal of enhancing (subjective) utility via changes in individual behavior and public policy is not condemned to inevitable failure by human psychology. Nonfixed, nongenetic factors, including individual choices and public policy, may influence satisfaction levels, or utility so measured. In this article we first document results of SOEP's direct test of set-point theory. Next, still using the SOEP data, we seek to contribute to a revised theory highlighting preferences and choices that cause change in life satisfaction. The weakness of set-point theory is that it is purely a theory of stability. The new challenge for researchers is to develop a theory that also accounts for change. Here, combining insights from economics and positive psychology, we estimate the effects of five sets of preferences and choices that will be shown to affect medium- and long-term happiness. These preferences and choices relate to characteristics of one's partner, life goals/priorities, religion, working hours vs. leisure hours, social participation, and healthy lifestyle.

Results

Psychologists and Economists Traveling in Divergent Research Directions. Set-point theory was developed in psychology in a cumulative and apparently convincing way over 30 y ago. By the mid-1990s it had become the dominant, paradigm theory of happiness. But it always rested on inferences, rather than direct tests. Inferences were made about the stability of adult happiness from numerous studies recording only the short-term effects of major life events (8, 9, 11). Inferences were also drawn from personality studies linking happiness to traits known to be stable in adulthood (1, 9, 16). Finally, twin studies, including evidence for monozygotic twins raised apart, appeared to show that happiness is 40–50% genetic (10). The most comprehensive twin study reached the conclusion that “trying to be happier may be as futile as trying to be taller” (10).

Within psychology, two groups of researchers have cast some doubt on set-point theory. Diener and coworkers observed that, in both German (SOEP) and Australian panels, some respondents report long-term changes in happiness (17–19). In pursuing

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this lead, Diener and coworkers appear to have assumed that changes must be due to major life events. However, in a recent comprehensive review, they conclude that the only event that has more than a temporary negative effect is long-term or repeated unemployment (11). They are unable to find any event that, on average, has a long-term positive effect on happiness.

A second group—positive psychologists—have not explicitly challenged set-point theory, but have adopted a different approach based on the premise that authentic happiness requires a life characterized by meaning and engagement, not just satisfaction (5–7). These psychologists have marshaled impressive but mainly cross-sectional or short-term evidence of the beneficial effects on happiness of character strengths, religion, volunteering, and acts of kindness (5–7). Until the German panel data became available, there was no direct long-term evidence of stability and change in happiness, or of the long-term effects of personal and economic choices.

Research on happiness (reabeled as subjective utility) by economists developed rapidly in the 1990s, ironically just as set-point theory became dominant as a result of twin studies. Economists have not developed a counter theory, but pursue a strategy of seeking to account for variance in life satisfaction due to individual utility maximizing behavior and policy interventions. However, a comprehensive recent review concluded that studies to date have shown only that behavioral choices and public policy have statistically significant effects on life satisfaction, but not that these effects are substantively important (20). In what follows, we review previous research and indicate how we hope to show more substantial effects.

Contrary to what a layperson might suppose, modern economists, starting with Richard Easterlin (the Easterlin paradox), have repeatedly claimed that money does not buy much happiness, especially in wealthy Western countries (21). The paradox has been challenged, most recently by Stevenson and Wolfers (22), but critics have never been able to show that long-term income growth produces long-term gains in happiness (23). This nonoutcome arises mainly because rising incomes are subject to social comparisons with the neighboring Jones's, whose incomes also keep going up. People adapt to their own and their neighbors' new levels of income by raising their expectations, with the result that no lasting increase in happiness occurs. However, in a first direct challenge to set-point theory, Easterlin observed that complete adaptation does not always occur following major events (e.g., the onset of a chronic health problem) in some noneconomic domains of life, notably the health and family domains (24). He suggested that individuals might be able to break away from their happiness set-points by prioritizing noneconomic domains. Prioritizing material success has been labeled by Nobel laureate Daniel Kahneman et al. (25) as a focusing illusion, based on paying too much attention to conventional indicators of advancement. Following this line of reasoning, the British economist Layard (26) proposed that Western governments reform their tax systems to encourage more leisure and less paid work.

On a related theme, experimental economists have shown that in laboratory settings many individuals favor egalitarian outcomes and cooperative rather than financially self-interested behavior (27, 28). There is even some experimental evidence that money spent on others reaped a higher happiness dividend than money spent on self (29). It is not entirely clear that these preferences hold firm in real-world situations (30). However, as previously discussed, positive psychologists have contributed substantially to a literature indicating that focusing on nonmonetary, even altruistic, goals may be a recipe for happiness.

The standard framework of welfare economics rests on the assumption that the main tradeoff that individuals make in trying to maximize their welfare or utility lies between work and leisure. Paid work provides the funds for consumption, whereas leisure time (it is assumed) generates pleasure. The overall validity of

the tradeoff assumption has not been directly tested using subjective measures of utility. In this article, we use the German panel data to show that changes in the fit between a person's preferred and actual working hours—and hence, by implication, their hours of leisure—have significant effects in changing life satisfaction.

Two other behavioral choices, which previous research has shown to be associated with enhanced life satisfaction, relate to participation in social networks and a healthy lifestyle. Numerous findings indicate that people who involve themselves in extensive social networks are somewhat happier than those who confine themselves to a narrow circle (1, 31). In a moment-to-moment sense people are on average happier with friends and acquaintances than with their spouses (31). A healthy lifestyle, indicated here by regular exercise and a satisfactory height-to-weight ratio (body mass index), have also been found to be correlated with higher life satisfaction (1, 31). By using longitudinal evidence, we are able to make stronger causal inferences by showing that people who increase their social participation or adopt a healthier lifestyle record increases in life satisfaction.

Is Happiness Stable? Testing Set-Point Theory. Do people really have stable set-points of happiness? It is odd but true that the concept of a happiness set-point has rarely been precisely defined, let alone measured. Our pragmatic approach, using panel data, is to take multiyear averages (means) of life satisfaction over medium-term periods (17). This is analogous to the approach taken by economists when they seek a proxy for “permanent income.” Multiyear averages, unlike single years of data, have the advantage of being less at the mercy of temporary fluctuations, which may be viewed as measurement error in assessing life satisfaction set-points. Fig. 1 shows percentages of the sample who recorded large and apparently lasting changes in life satisfaction over progressively longer periods in 1984–2008. The three graph lines show percentages who changed by 25 percentiles or more within the life satisfaction distribution (e.g., from the 50th to the 75th percentile), by 33.3 percentiles or more, and by 50 percentiles or more (e.g., from the 75th to the 25th percentile). We treat the first 5-y average (1984–1988) as an estimate of each person's initial life satisfaction set-point, and the last 5 y (2004–2008) as their latest set-point.

The cumulative pattern of change in life satisfaction over successive 5-y periods runs counter to set-point theory. The theory implies that individuals will keep reverting to their own set-point even over long periods. But what we find is that the further apart the 5-y periods are, the higher is the percentage of individuals recording substantial nontransient changes in satisfaction. Fig. 1 shows that by 2004–2008, 38.1% of respondents had changed their position in the life satisfaction distribution by

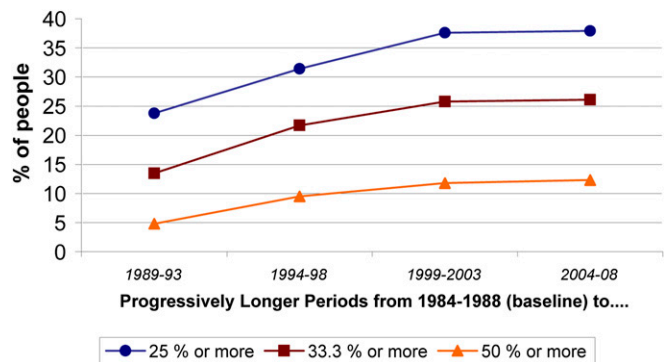


Fig. 1. Percentages recording large changes in life satisfaction: $\geq 25\%$, $\geq 33.3\%$, and $\geq 50\%$ (aged 25–64 y; $n = 853$).

25 percentiles or more, relative to their position in 1984–1988. A total of 25.5% had moved up or down by 33.3 percentiles or more, and 11.8% had changed by 50 percentiles or more (i.e., from the top to the bottom quarter of the distribution or vice versa). However, although change is cumulative, the rate of change is not constant. It diminishes over time. The downward trend in Pearson correlations between life satisfaction in 1984–1988 and subsequent 5-y periods (0.69, 0.52, 0.48, and 0.45) confirms this pattern. Results are consistent with a view that some stabilizing factors are at work (e.g., personality traits), but that there are also factors causing change in life satisfaction (e.g., economic and personal choices).

Preferences and Choices That Affect Long-Term Happiness. So the challenge now for research is to develop a revised theory that accounts for both stability and change. Still using the German panel, we take some first steps. The panel dataset includes variables known to promote stability, including personality traits, and also variables that, we hypothesize, might make a difference or change one's happiness: partner personality traits, life priorities, religion, actual and preferred working hours, social participation, and healthy lifestyle. Our analytic approach in the rest of the paper is to net out the effects on life satisfaction of the stable personality traits and genetic factors highlighted by set-point theory in an attempt to estimate the magnitude and significance of additional effects attributable to differences and changes in life goals/priorities and choice variables.

It would presumably be unforgivable to complete a personality inventory before deciding to live together. However, if the request were made, the inventory of choice might be the NEO-AC (32)—a measure of the five traits that many psychologists think describe normal or nonpsychotic personality. Those traits include neuroticism (emotional instability), extroversion (sociability), openness to experience, agreeableness, and conscientiousness. The NEO-AC is included in the SOEP survey, and because both partners are interviewed, we can analyze the effects of partner personality on life satisfaction over and above the effects of one's own personality. It transpires that the trait that matters most is neuroticism. A panel regression analysis, using all 25 waves of SOEP data (*SI Materials and Methods*), indicates that individuals with relatively neurotic partners are significantly less happy than those with more emotionally stable partners. For men, the metric regression coefficient linking partner's neuroticism to their own lower life satisfaction is -0.10 ($P < 0.001$) and for women it is -0.08 ($P < 0.001$). Not surprisingly, one's own level of neuroticism makes a bigger difference (men: $\beta = -0.22$, $P < 0.001$; women: $\beta = -0.21$, $P < 0.001$), but that finding is well known, whereas the additional impact of partner neuroticism is a somewhat newer finding and shows that choices matter.

A conjecture often put forward is that partners with similar personalities are likely to be happier than those with contrasting traits (33). This was tested by constructing self and partner similarity/difference scores for each of the five traits and entering these scores as additional variables in the panel regression analyses. It transpired that partner similarity was not associated with any additional benefits (or reductions) in life satisfaction. A parallel result has been reported in regard to marital satisfaction (33).

It is worth stressing that, because adult personality is stable, our findings suggest that partnering/marrying a person with favorable traits will probably bring a long-term gain in one's happiness (if the partnership lasts), whereas partnering a person with unfavorable traits will probably cause long-term loss (34). To further assess this, we ran separate analyses for partners who had lived together <5 y, 5–10 y, 10–20 y, and >20 y. Regardless of the longevity of the relationship, partner personality traits, especially neuroticism, had a substantial effect on life satisfaction. There appeared to be no decline in these effects as time passed.

Life Goals/Priorities and Partner's Life Priorities. Contrary to the implications of set-point theory, it also appears that an individual's consciously chosen life goals/priorities and, to some extent, his/her partner's priorities can influence life satisfaction. The SOEP survey measures respondents' commitment to three sets of goals: career and material success goals, family goals, and altruistic non-zero-sum goals. Respondents are asked to rate the importance they attach to each goal on a 1–4 scale running from “not at all important” to “very important.” Success goals include “being able to buy things” and “success in my job.” Family goals include having a “good marriage” and “good relationship with children.” Altruistic goals include “helping other people” and “being involved in social and political activities.” It is not easy to measure life goals/priorities in survey interviews, but it transpires that these SOEP measures, which have now been collected five times between 1990 and 2008, display satisfactory internal consistency and a stable factor structure (35). It may also be mentioned that those who claim to have altruistic goals back it up by engaging in more voluntary activity (*SI Materials and Methods*).

Previous research has shown that persistent rather than transient commitment to altruistic life goals is what matters to life satisfaction (35). So in analyzing their impact here, we simply averaged individuals' priority ratings for altruistic, family, and success goals in the five available surveys. Personality traits and demographic characteristics were regarded as causally antecedent to life goals, and so were controlled in equations assessing the impact of goals on life satisfaction. Again, panel regression analysis was the preferred technique.

The evidence indicates that people who consistently prioritize non-zero-sum altruistic goals or family goals are more satisfied with life than people who prioritize goals relating to their own careers and material success. Giving priority to altruistic goals is strongly associated with higher life satisfaction ($\beta = 0.36$, $P < 0.001$), whereas family goals are also satisfaction enhancing ($\beta = 0.26$, $P < 0.001$). Corroborating some previous research (6), it appears that prioritizing success and material goals is actually harmful to life satisfaction ($\beta = -0.21$, $P < 0.001$). Results for men and women are fairly similar, but an interesting gender difference emerges when we include partner's life goals in the analysis. It transpires that women whose partners give high priority to family goals are significantly happier than women whose partners give family matters lower priority ($\beta = 0.24$, $P < 0.001$).

It should be stressed that what is being assessed here is the relative importance of different goals. A large majority of respondents actually give top priority to family goals. But the findings show that those who give relatively high priority to prosocial or altruistic goals and family goals tend to be more satisfied with life.

Religion: Church Attendance. Somewhat related to life goals are religious belief and behavior. In the German panel, religious people (predominantly Christians, but including a Muslim minority) give higher priority to altruistic and family goals, and lower priority to success goals than nonbelievers. They also spend more time on volunteer activities (36). Many previous research reports have commented on the positive cross-sectional association between religious adherence and happiness (37). Making use of the panel design, we can extend this by showing a positive relationship between long-term church attendance and long-term gains and losses in life satisfaction (36). Church attendance is clearly a behavioral measure of the kind that economists generally prefer. However, it should be conceded that we are unable to assess whether religious belief or behavior has more effect on changes in life satisfaction, because only the behavioral measure has been regularly included in the panel questionnaire.

Actual and Preferred Working Hours, Social Participation, and Healthy Lifestyle. Next, we consider what should arguably be an important

issue for welfare economists—the degree to which achieving one’s preferred tradeoff between work and leisure actually contributes to subjective utility. Respondents in the SOEP panel are asked both how many hours per week they actually work (in all jobs combined, if they have more than one job) and how many they would prefer to work. The gap between these two figures can be treated as a rough measure of the degree to which, given their labor market opportunities and constraints, they are achieving their preferred tradeoff between work and leisure. Here we classify individuals whose actual working time per week is within 3 h of their preferred time as having their preferences met. We treat those who work over 3 h more than they want as overworked, and those who work over 3 h less than they want as underworked. Two other groups are also included: unemployed people who are actively seeking work and people not currently in the labor force (inactive).

The longitudinal evidence, shown in Table 1, clearly indicates that people who find themselves working much more or less than they want are significantly less satisfied with life than those who come close to making their preferred tradeoff between work and leisure. For both men and women, being underworked (men and women: $\beta = -0.09, P < 0.001$) is much worse than being overworked, presumably because lost consumption rankles worse than lost leisure. Being involuntarily unemployed is worst of all (men: $\beta = -0.51, P < 0.001$; women: $\beta = -0.30, P < 0.001$).

The remaining set of choices whose effects on life satisfaction we consider relate to social participation and healthy lifestyle. Questions have been asked every year in SOEP about participation in social activities. The social participation index used here combines two highly correlated items about frequency of “meeting with friends, relatives or neighbors” and “helping out friends, relatives or neighbors.” The only healthy lifestyle question that has been asked since SOEP began deals with participation in active sport or exercise, which is reported on a 1–4 scale running from “almost never” to “at least once a week.” In recent years, BMI (in kg/m^2) has also been measured, and may perhaps be regarded as an indication of commitment to a healthy lifestyle. A BMI of less than 18.5 is conventionally considered underweight, 18.5–24.9 is normal weight, 25.0–29.9 is considered overweight, and a BMI of 30 or more is considered obese.

The SOEP evidence indicates that both active social participation and exercise are positively related to life satisfaction. The linkages are strongly significant and similar for men (social

participation: $\beta = 0.07, P < 0.001$; exercise: $\beta = 0.03, P < 0.001$) and women (social participation: $\beta = 0.06, P < 0.001$; exercise: $\beta = 0.02, P < 0.001$). The longitudinal analysis reported in Table 1 makes it clear that individuals who change their behavior toward increasing or decreasing their levels of social participation or exercise show concomitant gains or losses in satisfaction.

Finally, using BMI as a lifestyle indicator, it appears that for men, being underweight, but not overweight or obese, is associated with lower life satisfaction ($\beta = -0.46, P < 0.05$). Obese women are relatively unhappy ($\beta = -0.22, P < 0.001$), but women classified here as overweight report about average levels of life satisfaction.

Discussion

A direct test of set-point theory shows that it is seriously flawed. A substantial segment of the German population has recorded long-term and apparently permanent changes in happiness. Plainly, the evidence relates only to one country, but previous research has indicated that correlates of happiness found in one developed country almost invariably replicate in others (38).

Contrary to the implications of set-point theory, it seems clear that human beings can escape the hedonic treadmill. Following lines of inquiry favored by economists and positive psychologists, we have shown that life goals, religion, and personal choices matter for happiness. Key choices relate to one’s partner, the tradeoff between work and leisure, social participation, and healthy lifestyle. Life goals and choices have as much or more impact on life satisfaction than variables routinely described as important in previous research, including extroversion and being married or partnered. If we use these last two variables as benchmarks, it appears that partner’s level of neuroticism, one’s own commitment to family and altruistic goals, church attendance, participation in social events, and regular exercise are all equally or more important than being extroverted (*SI Materials and Methods*). For both men and women, doing fewer paid hours of work than they want apparently has close to the same impact on life satisfaction as not being married/partnered. For women, being obese actually reduces life satisfaction more than not having a partner.

Attributing outcomes to individual preferences and choices is often regarded as problematic in the social sciences, although less so in economics. Obviously, choices may be more or less constrained. On the face of it, however, choices relating to partner personality traits, life goals/priorities, the work-leisure tradeoff, social participation, and healthy lifestyle appear relatively unconstrained. However, there may be some reverse causation at work. Happiness may affect life choices, as well as vice versa. For example, some unhappy or depressed people may find it difficult to engage in social activities or regular exercise, and some neurotic individuals may have to settle for neurotic partners. A further point is that individuals may deliberately make choices that give greater weight to desiderata other than happiness. In practice, little is known about the relative weight given to happiness in making life choices. One recent study indicated that happiness is usually an important criterion but by no means the only one (39).

Results showing that long-term happiness can be substantially affected by individual choices are good news, not only for economists but also for governments and humankind. If set-point theory were the full story, there would be no point in economists’ treating measures of life satisfaction as equivalent to subjective utility, and then evaluating individual behaviors and public policies in terms of impact on subjective utility. Further, if individual choices can make a difference to subjective utility, so presumably can governmental and public policy decisions.

Evidence that the long-term life satisfaction of many individuals is not stable should open up an exciting period in happiness research. Arguably, set-point theory has been stultifying in its implication that long-term change is improbable and that a person’s happiness is little more than a printout of the characteristics

Table 1. Effects of working hours, social participation, and healthy lifestyle on life satisfaction: GLS fixed-effects panel regressions (metric coefficients, *P* values based on robust SEs)

	All respondents [†]	Men [†]	Women [†]
Underworked [‡]	−0.08***	−0.07***	−0.07***
Overworked [‡]	−0.02*	−0.02**	−0.01
Unemployed [‡]	−0.32***	−0.44***	−0.23***
Not in labor force [‡]	−0.10***	−0.24***	−0.03
Social participation	0.06***	0.07***	0.06***
Exercise frequency	0.02***	0.03***	0.02***
<i>R</i> ² _S	5.3%	7.6%	4.3%
<i>N</i>	142,390	69,842	72,548

P values are given to three decimal places. Statistically significant (**P* = 0.05; ***P* = 0.01; ****P* = 0.001).

[†]All results (coefficients) are net of age, age squared, age cubed, partner status (1–0), health disability (1–0), being East German (1–0), being foreign born (1–0), life events, the national unemployment rate, and number of years interviewed.

[‡]Reference group: individuals who work within ± 3 h of the working time they prefer.

[§]The *R*² reported here is a weighted average of variance accounted for “between persons” and “within persons.”

that he/she was born with and that were developed and expressed early in life. It followed that neither individual goals, choices, strategies, and skills, nor public policy decisions, could do much to enhance happiness. Finding that happiness levels are responsive to life priorities and choices confirms the value of approaches taken by economists and positive psychologists, and means that work in these areas can be pursued with renewed purpose.

Materials and Methods

The German Socio-Economic Panel is the largest and longest running panel survey in the world, conducting interviews with all adult and youth members of the same households every year (15). Previous panels, notably the US Panel Study of Income Dynamics, relied on one respondent per household. SOEP began in West Germany in 1984 and was extended to East Germany in 1990. The representativeness of the panel is maintained by interviewing split-offs and their new families. For example, when a young person leaves home (splits off) to marry and set up a new family, the entire new family becomes part of the panel. There are now over 60,000 respondents on file, including children and a few grandchildren of the original respondents. The sample used here is restricted to prime-age adults (25–64 y). This is precisely the age group who, according to set-point theory, should report stable levels of happiness.

A question about life satisfaction is included in the survey every year, embedded among questions about satisfaction with specific aspects of life. It

is asked on a standard 0–10 scale running from “completely dissatisfied” to “completely satisfied” (mean = 6.96, SD = 1.82). This scale is used in many national and international surveys and is generally accepted as adequately reliable and valid (1).

Almost all analysis of panel surveys is based on annual data, reflecting the time interval at which interviews are conducted. But it is well established that annual changes in life satisfaction are mainly just temporary fluctuations due to life events (11). Our aim here is to account for medium- and long-term stability and change, so it was appropriate to calculate 5-y averages of life satisfaction scores for the 25 y of data (1984–1988, 1989–1993, etc.) and to assign these averages to each year within its 5-y period. This setup allows us to relate respondents' scores for each explanatory variable to measures of medium-term change in life satisfaction.

All statistical results in the paper are based on standard, well-established panel regression techniques. Results relating to the effects on life satisfaction of partner personality traits and life goals are based on generalized least squares (GLS) random-effects analyses. Results relating to the work-leisure tradeoff, social participation, and exercise are based on GLS fixed-effects analyses (*SI Materials and Methods*).

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