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# Why is intelligence associated with stability of happiness?

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In the National Child Development Study, life-course variability in happiness over 18 years was significantly negatively associated with its mean level (happier individuals were more stable in their happiness, and it was *not* due to the ceiling effect), as well as childhood general intelligence and all Big Five personality factors (except for Agreeableness). In a multiple regression analysis, childhood general intelligence was the strongest predictor of life-course variability in life satisfaction, stronger than all Big Five personality factors, including Emotional stability. More intelligent individuals were significantly more stable in their happiness, and it was not entirely because: (1) they were more educated and wealthier (even though they were); (2) they were healthier (even though they were); (3) they were more stable in their marital status (even though they were); (4) they were happier (even though they were); (5) they were better able to assess their own happiness accurately (even though they were); or (6) they were better able to recall their previous responses more accurately or they were more honest in their survey responses (even though they were both). While I could exclude all of these alternative explanations, it ultimately remained unclear *why* more intelligent individuals were more stable in their happiness.

Most empirical studies in positive psychology and the economics of happiness have analysed the *level* of subjective well-being, by examining who was happier than whom and what individual and social factors were associated with the level of happiness. For example, wealthier individuals were happier than poorer individuals, and people in wealthier nations were happier than people in poorer nations (Diener, Diener, & Diener, 1995), although only up to a point, beyond which additional income did not appear to produce greater happiness. Similarly, married individuals (Haring-Hidore, Stock, Okun, & Witter, 1985) and religious individuals (Ferriss, 2002) tended to have higher *levels* of subjective well-being.

Fewer studies have examined *variability* or *stability* in subjective well-being. Some longitudinal and panel studies tracked trends and changes in subjective well-being, either at the individual level as the life-course trends in happiness (Baird, Lucas, & Donnellan, 2010; Mroczek & Spiro, 2005) or at the societal level as the changes in aggregate mean level of happiness (Stevenson & Wolfers, 2009). Others have focused on the variability in subjective well-being over time.

In their behaviour genetic analysis of the Minnesota Twin Registry, Lykken and Tellegen (1996) estimated that happiness measured at Age 20 and at Age 30 were

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correlated at .50. Similarly, Schimmack and Oishi's (2005) meta-analysis showed that measures of happiness obtained 15 years apart were correlated at about .25. Fujita and Diener (2005) found in their analysis of the German Socio-Economic Panel that measures of life satisfaction over 17 years, disattenuated for measurement errors, were correlated at .34, and that the correlation between the mean and the standard deviation was significantly negative ($r = -.47$, $p < .05$, $n = 3{,}608$). Most recently, Lucas and Donnellan (2007) estimated that 34% of the variance in life satisfaction measures in the German Socio-Economic Panel Study and 38% of the variance in the British Household Panel Study were attributable to stable trait and thus did not change over time.

All of these studies on the stability of happiness, however, were *univariate* and *descriptive*. They described how stable or variable individuals' subjective well-being was over time. They did not treat the variability as an individual-difference variable; they did not explain which individuals with what characteristics were more or less stable in their happiness over time. There is one exception. Eid and Diener (1999) followed the daily fluctuations in positive and negative affect among 180 college students over seven weeks. Their analysis showed that the standard deviation in happiness had no significant bivariate correlation with any of the Big Five personality factors, but their multiple regression analysis, which included the mean, mean squared, and all Big Five factors, showed that Neuroticism significantly increased the daily variability in happiness.

At the same time, with a few exceptions (Ali *et al.*, 2013; Isaacowitz & Smith, 2003; Siedlecki, Tucker-Drob, Oishi, & Salthouse, 2008), general intelligence has not figured prominently as a possible determinant or correlate of subjective well-being. In a comprehensive review of studies in the economics of happiness on the correlates of subjective well-being, intelligence was only briefly mentioned once as a possible unobservable trait related to education (Dolan, Peasgood, & White, 2008, pp. 99–100). The few studies that examined the influence of intelligence on happiness generally concluded that the effect was nil (Watten, Syversen, & Myhrer, 1995) or entirely mediated by demographic factors such as health and marital status (Sigelman, 1981). An international study of 192 nations showed that, of a large number of macrosocial and macroeconomic variables examined, the average level of happiness was the only factor not significantly associated with the average level of intelligence in the population (Lynn & Vanhanen, 2006). As a result, Watten *et al.* (1995, p. 296) concluded that 'intelligence is virtually unrelated to QOL [quality of life]. Thus, we find IQ to be a variable of minor interest for future QOL studies.'

Siedlecki *et al.* (2008) showed that general (fluid) intelligence was significantly associated with life satisfaction among young and middle-aged adults, but not among older adults. This might have been because general intelligence appeared to increase both positive affect and negative affect simultaneously among the elderly population (Isaacowitz & Smith, 2003).

The purposes of the current study were twofold. First, continuing and extending the earlier work by Lykken and Tellegen (1996), Schimmack and Oishi (2005), Fujita and Diener (2005), and Lucas and Donnellan (2007), I focused on the variability and stability of happiness over time. I treated it as an individual-difference variable and explored its possible correlates. Second, I introduced general intelligence as an important factor in positive psychology in general and a significant determinant of the variability of happiness over the life course in particular.

### *General intelligence and stability in happiness*

There are numerous theoretical and empirical reasons to expect general intelligence to be negatively associated with life-course variability in subjective well-being. Some of these factors predict that more intelligent individuals are genuinely less variable in their subjective well-being; others predict that they merely *appear* to be so due to some methodological or measurement reasons.

#### *Education, wealth, and control over life circumstances*

Childhood general intelligence is significantly positively associated with education and earnings; more intelligent individuals on average achieve greater education and earn more money (Brown & Reynolds, 1975; Nagoshi, Johnson, & Honbo, 1993; Snow & Yalow, 1982). Intelligence also predicts negative life events, such as accidents, injuries, and unemployment (Lynn, Hampson, & Magee, 1984; O'Toole, 1990; Smith & Kirkham, 1982). If more intelligent individuals exercise greater control over their life circumstances, because their resources protect them from unexpected external shocks in their environment, then we would expect more intelligent, more educated and wealthier individuals to experience less variability in their subjective well-being over time. Studies in positive psychology generally show that individuals return to their baseline 'happiness set point' after major life events, both positive and negative (Lucas, 2007). So, if less intelligent, and thus less educated and wealthy, individuals experience more negative life events, which temporarily lower their subjective well-being before they return to their baseline 'happiness set points', then they are expected to have greater life-course variability in happiness.

#### *Health*

It has by now been well established in the emerging field of cognitive epidemiology that intelligence is associated with health and longevity, and that more intelligent children on average tend to live longer and healthier lives than less intelligent children, although it is not known why (Batty, Deary, & Gottfredson, 2007; Gottfredson & Deary, 2004; Kanazawa, 2006). And health is significantly associated with psychological well-being (Okun, Stock, Haring, & Witter, 1984). So, it is possible that more intelligent individuals are more stable in their happiness over time because they are more likely to remain constantly healthy than less intelligent individuals.

#### *Marital status*

One of the most consistent and strongest correlates of subjective well-being is marital status; married individuals are on average happier than unmarried individuals (Haring-Hidore *et al.*, 1985). Divorce and marriage often represent troughs and peaks of happiness in an individual's life, and intelligence is negatively associated with odds of divorce (Holley, Yabiku, & Benin, 2006). If more intelligent individuals are more likely to be consistently married throughout adulthood whereas less intelligent individuals are more likely to go through marriage, divorce, and remarriage, then general intelligence and life-course variability in subjective well-being will be negatively associated.

#### *Mean subjective well-being*

More intelligent individuals tend to be happier than less intelligent individuals (Ali *et al.*, 2013), and the mean and the variability of life satisfaction are negatively correlated (Fujita

& Diener, 2005). So, more intelligent individuals may appear to be more stable in their happiness simply because they are happier than less intelligent individuals and because the variability is an inverse function of the mean.

### *Greater ability to assess their own subjective well-being*

Another possibility is that more intelligent individuals may be better able to assess their own level of subjective well-being more accurately at any point, so their stated level of life satisfaction remains more stable, reflecting its true stable level. In contrast, less intelligent individuals may be less able to assess it accurately, and, as a result, their verbal responses to the same survey questions tend to vary more over time at different surveys, even when their true life satisfaction remains stable.[1]

Another possible explanation for the effect of childhood general intelligence on life-course variability in subjective well-being involves active gene–environment interaction. More intelligent individuals may be better able to control their environment more efficiently, even above and beyond the ability afforded by their higher education and earnings, and may thus be able to live their lives more as they wish, and their lives may be less subject to unexpected environmental fluctuations, than less intelligent individuals. If this is the case, then, among other things, more intelligent individuals should be better able to predict the future states of their lives, and their future levels of happiness, than less intelligent individuals. Such greater ability to control their environment and predict its future states may also lead to more stable levels of happiness over time.

### *Recall accuracy and honesty*

Both working memory and long-term memory are integral components of general intelligence, and more intelligent individuals on average have better memory (Unsworth, 2010). So, it is reasonable to expect that more intelligent individuals are better able to remember what their response was to the same question in an earlier survey in a longitudinal study. If more intelligent individuals are better able to recall their own responses to the same question in previous surveys, then it would allow them to *appear* to be more consistent, even when they are not. Lucas and Donnellan (2007) noted that this 'autoregressive' component accounted for about 29–34% of the variance in happiness over time.

Alternatively, it is possible that more intelligent individuals are more honest in their survey responses than less intelligent individuals. If everyone's subjective well-being is equally stable, then more honest individuals provide more consistent responses about their life satisfaction than less honest individuals, whose verbal responses fluctuate as a result of their dishonesty, even when their true level of happiness is constant.

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[1] *In some sense, whether and to what extent individuals can assess their 'true' level of subjective well-being may not be a legitimate question. It is possible to argue that, regardless of their objective life circumstances, individuals' true level of happiness is whatever they subjectively feel and express as it is. If poor, unemployed, unhealthy, unmarried individuals without any friends or family say they are 'extremely happy', is that a 'wrong' response? This is somewhat akin to the question some political psychologists ask of whether voters in a free democracy can vote in their 'true' interest or whether they sometimes vote for the 'wrong' candidate due to limited information (Miller, 1986). I will leave to future research the intriguing question of whether there is such a thing as a 'true' level of happiness apart from what an individual subjectively feels and expresses in a survey response. This is of course a separate question from whether individuals are willing to express how happy they subjectively feel on a survey response.*

The first three explanations above (education, wealth, and control over life circumstances; health; and marital status) propose that intelligence is a *genuine* correlate of life-course variability in subjective well-being, while the last three explanations (mean subjective well-being; greater ability to assess their own subjective well-being; and recall accuracy and honesty) suggest that the association between intelligence and life-course variability in subjective well-being may be due to methodological or measurement reasons.

## Methods

### *Data: National Child Development Study (NCDS)*

The National Child Development Study (NCDS) is a large-scale prospectively longitudinal study, which has followed British respondents since birth for more than half a century. The initial sample included *all* babies ($n$ = 17,419) born in Great Britain (England, Wales, and Scotland) during 1 week (03–09 March 1958). The respondents were subsequently reinterviewed in 1965 (Sweep 1 at Age 7: $n$ = 15,496), in 1969 (Sweep 2 at Age 11: $n$ = 18,285), in 1974 (Sweep 3 at Age 16: $n$ = 14,469), in 1981 (Sweep 4 at Age 23: $n$ = 12,537), in 1991 (Sweep 5 at Age 33: $n$ = 11,469), in 1999–2000 (Sweep 6 at Ages 41–42: $n$ = 11,419), in 2004–2005 (Sweep 7 at Age 46–47: $n$ = 9,534), and in 2008–2009 (Sweep 8 at Age 50–51: $n$ = 9,790). There were more respondents in Sweep 2 than in the initial sample (Sweep 0) because Sweep 2 sample included eligible children who were in the country in 1969 but not in 1958. In each sweep, personal interviews and questionnaires were administered to the respondents, their mothers, teachers, and doctors during childhood, and to their partners and children in adulthood. Virtually all (97.8%) of the NCDS respondents in the initial sample were Caucasian.

### *Dependent variables: Measures of the life-course variability in subjective well-being*

At Ages 33, 42, 47, and 51, the NCDS asked its respondents the identical question: ‘Here is a scale from 0 to 10, where ‘0’ means that you are completely dissatisfied and ‘10’ means that you are completely satisfied. Please enter the number which corresponds with how satisfied or dissatisfied you are with the way life has turned out so far’.

From this measure of life satisfaction on the scale of 0–10 and measured four times over the course of 18 years in adulthood, I constructed five different measures of its life-course variability.

1. Variance = $\frac{\sum_{i=1}^{4}(x_i-\bar{x})^2}{4}$
2. Maximum absolute difference = $|x_{max}-x_{min}|$
3. Sum of the absolute values of movements from one sweep to the next = $\sum_{i=1}^{3}|(x_{i+1}-x_i)|$
4. Sum of squared movements from one sweep to the next = $\sum_{i=1}^{3}(x_{i+1}-x_i)^2$
5. Coefficient of variation[2] = $\frac{\sigma_x}{\mu_x}$

[2] *Technically, the coefficient of variation is appropriate only for strictly ratio variables, which the measure of subjective well-being in NCDS is not. This may explain its slightly lower correlation with other indicators of variability and its slightly lower factor loading below.*

### *Dependent variables: measures of life-course variability in job and relationship satisfaction*

At Ages 23, 42, 47, and 51, NCDS asked its respondents about their job satisfaction (either for their current or last job) on a 5-point scale: 1 = *very dissatisfied*, 2 = *dissatisfied*, 3 = *neither satisfied nor dissatisfied*, 4 = *satisfied*, 5 = *very satisfied*. Similarly, at Ages 33, 42, and 51, NCDS asked its respondents who are in a committed relationship about their relationship satisfaction on a 7-point scale, from 1 = *very unhappy* to 7 = *very happy*. From these four measures of job satisfaction and three measures of relationship satisfaction, I constructed the same five indicators of their variability as I have done with the measures of subjective well-being above, for comparative purposes.

### *Independent variables: Childhood general intelligence*

The NCDS has one of the strongest measures of childhood general intelligence of all large-scale surveys. The respondents took multiple intelligence tests at Ages 7, 11, and 16. At 7, they took four cognitive tests (Copying Designs, Draw-a-Man, Southgate Group Reading, and Problem Arithmetic). At 11, they took five cognitive tests (Verbal General Ability, Nonverbal General Ability, Reading Comprehension, Mathematical, and Copying Designs). At 16, they took two cognitive tests (Reading Comprehension and Mathematical Comprehension). I first performed a factor analysis at each age to compute their general intelligence score for each age. All cognitive test scores at each age loaded only on one latent factor, with reasonably high factor loadings (Age 7: Copying Designs = .67, Draw-a-Man = .70, Southgate Group Reading = .78, and Problem Arithmetic = .76; Age 11: Verbal General Ability = .92, Nonverbal General Ability = .89, Reading Comprehension = .86, Mathematical = .90, and Copying Designs = .49; Age 16: Reading Comprehension = .91, and Mathematics Comprehension = .91). The latent general intelligence scores at each age were converted into the standard IQ metric, with a mean of 100 and a standard deviation of 15. Then, I performed a second-order factor analysis with the IQ scores at three different ages to compute the overall childhood general intelligence score. The three IQ scores loaded only on one latent factor with very high factor loadings (Age 7 = .87; Age 11 = .95; Age 16 = .92). I used the childhood general intelligence score in the standard IQ metric as the main independent variable in my analyses of the life-course variability in subjective well-being.

### *Independent variables: Big Five personality factors*

The NCDS measured the Big Five personality factors (Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Emotional stability) with the 50-item International Personality Item Pool scale (http://ipip.ori.org/New_IPIP-50-item-scale.htm; Goldberg, 1992). For each factor, the score ranged from 5 to 50. Unfortunately, the NCDS only measured the Big Five personality factors at Age 51. However, personality psychologists generally concur that individual personality, including the Big Five, remains largely constant throughout the life course, although there are some individual differences in its stability (Mroczek & Spiro, 2003). One of the major influences on changes over time is age (Roberts & DelVecchio, 2000), which all respondents share in cohort data like the NCDS; all NCDS respondents are exactly the same age (within 1 week) at any given sweep. So, I assumed that the NCDS respondents' scores on the Big Five measured at Age 51 were largely representative of their personality throughout their lives. However, it is important to note that the Age 51 measures of Big Five personality factors were a major shortcoming for my analysis, as personality factors, while relatively stable, are never perfectly so.

### *Control variables*

To test the various hypotheses about the effect of childhood general intelligence on life-course variability in subjective well-being, the statistical models included a large number of control variables to see if any of them could explain away the association between general intelligence and life-course variability in subjective well-being. The table in the Appendix presents the means, standard deviations, and the correlation matrix for all the variables used in the multiple regression analyses below. It presents both these statistics based on pairwise deletion of cases for missing data (below the diagonal and in Roman) and on maximum-likelihood (expectation-maximization) estimates for missing data (above the diagonal and in italics). The close similarities between the two sets of statistics suggested that missing data might not have presented significant problems for the NCDS data.

#### *Education and earnings*

NCDS respondents' education was measured at Age 23 by a 6-point ordinal scale, reflecting the highly complex system of examinations, qualifications, and certifications in the British school system: 0 = *no qualification*; 1 = *CSE 2–5/NVQ 1*; 2 = *O levels/NVQ 2*; 3 = *A levels/NVQ 3*; 4 = *higher qualification/NVQ 4*; 5 = *degree/NVQ 5–6*. Earnings were measured at Age 33 in 1K GBP.

#### *Health*

At each sweep, the NCDS asked its respondents to rate their own health. At Ages 23, 33, and 42, the respondents rated their health on a 4-point ordinal scale (1 = *poor*, 2 = *fair*, 3 = *good*, 4 = *excellent*); at Ages 47 and 51, they rated it on a 5-point ordinal scale (1 = *very poor*, 2 = *poor*, 3 = *fair*, 4 = *good*, 5 = *excellent*). In factor analysis, the five measures of self-rated health loaded on only one latent factor, with reasonably high factor loadings (Age 23 = .58; Age 33 = .72, Age 42 = .78, Age 47 = .77, Age 51 = .79). I used the latent factor as a measure of adult self-rated health between Ages 23 and 51.

Self-rated health may not always be a perfect measure of actual health, as the former may be correlated with optimism and other individual differences (Layes, Asada, & Kephart, 2012). However, the lifetime measure of self-rated health did correlate significantly with some objective measures of health, such as BMI at 51 ($r = -.20$, $n = 6{,}125$, $p < .001$), lifetime number of days hospitalized ($r = -.22$, $n = 6{,}347$, $p < .001$), and lifetime number of hospital admissions ($r = -.25$, $n = 6{,}336$, $p < .001$) in the NCDS data. Epidemiological studies show that self-rated health accurately predicts mortality, morbidity, and onset of illnesses (Goldberg, Gueguen, Schmaus, Nakache, & Goldberg, 2001; Kaplan & Camacho, 1983; Mossey & Shapiro 1982).

#### *Marital status*

I controlled for whether the respondent was currently married at Ages 33, 42, 47, and 51. More intelligent individuals *were* indeed more consistently married. Childhood general intelligence was significantly positively associated with being currently married throughout adulthood (Age 33: $r = .02, p = .0508, n = 6{,}486$; Age 42: $r = .07, p < .001, n = 6{,}690$; Age 47: $r = .08, p < .001, n = 5{,}725$; Age 51: $r = .08, p < .001, n = 5{,}814$). Even though being currently married at these ages were positively correlated with each other, collinearity was not a problem at all; the largest VIF in the equation in Table 4 (associated with being currently married at Age 47) was 3.98 (O'Brien, 2007).

### *Mean subjective well-being*

I controlled for the lifetime mean subjective well-being. Childhood general intelligence was significantly (although weakly) positively associated with lifetime mean subjective well-being (bivariate $r = .08$, $p < .001$, $n = 4{,}488$), even net of sex, education, and earnings at 33 (partial $r = .04, p < .05, n = 3{,}529$).

### *Ability to assess own subjective well-being*

It was extremely difficult to measure a survey respondent's ability to assess own internal states like happiness, because I did not have access to the NCDS respondents' *true* level of life satisfaction. Just like every other user of survey data, I was at the mercy of the verbal responses they gave, and I had no way of assessing how accurate they were. However, there was an indirect means of measuring the accuracy of respondent's response.

At 33 and 42, NCDS asked its respondents to estimate how satisfied they would be with how their life has turned out in 10 years on the same 11-point scale. I was therefore able to compare their estimate for 43 with their actual response at 42, and their estimate for 52 with their actual response at 51. By taking the absolute value of the difference, I computed the degree of inaccuracy of their estimation. If less intelligent individuals are less able to assess their *current* level of happiness, then one would assume that they are even less able to assess its *future* level in 10 years.

As it turned out, childhood general intelligence was significantly and moderately negatively correlated with the degree of inaccuracy of prediction (Age 33: $r = -.16$, $p < .001$, $n = 5{,}559$; Age 42: $r = -.14$, $p < .001$, $n = 5{,}373$). So, more intelligent individuals indeed appeared to be slightly better able to predict their future level of happiness than less intelligent individuals. I used the prediction inaccuracies at 33 and 42 as proxy measures of the respondent's ability to assess their own current level of subjective well-being accurately.

The measures of prediction inaccuracy were admittedly very oblique and indirect indicators of respondents' concurrent ability to assess their own subjective well-being accurately. They might be subject to unforeseeable events, general misconceptions or illusions about future developments, different uses of Likert scales over time, and other potential factors unrelated to respondents' ability to assess their own current level of subjective well-being accurately. However, there seemed no reason to believe that these unobserved factors were significantly related to childhood general intelligence. Thus, such unobserved factors could only increase noise (random measurement errors) and were not expected to bias the estimates via systematic measurement errors. At any rate, as stated above, it was virtually impossible to get a direct and accurate measure of respondents' ability to assess their own true subjective well-being as the latter was entirely unobservable, and measures of prediction inaccuracy were the best available proxies for it in the NCDS data. Prediction inaccuracies at 33 and 42 also served to measure NCDS respondents' ability to control their personal lives and environments, and might be used to rule out this related explanation.

*Recall accuracy and honesty*

Once again, as with the ability to assess own subjective well-being, it was difficult to measure recall accuracy and honesty of respondents, as I had no access to NCDS respondents' *true* level of happiness apart from their recorded responses. However, one unique feature of the NCDS data allowed me to estimate both the respondents' accuracy of recall (and their ability to appear consistent) and their level of honesty.

At 23 and 42, NCDS measured respondents' height via self-report; the respondents told the interviewer how tall they were. At 33, however, the interviewer measured the respondent's height objectively with 'a portable measuring equipment'. I assumed that most NCDS respondents had stopped growing by 23 and had attained their adult height. Then, by comparing their verbal responses at 23 and 42, I could estimate how accurately they recalled their responses or how consistent they were over 19 years. By comparing their verbal response at 42 with the objective measure at 33, I could estimate how honest they were in their survey responses. However, I acknowledge that potential motivations to manipulate or make errors in reports of height might be different from those in reports of subjective well-being.

As it turned out, more intelligent NCDS respondents were simultaneously more accurate in their recall and more honest in their responses. Childhood general intelligence was significantly negatively associated with both the measure of recall inaccuracy (the absolute value of the difference between their reported height at 42 and their reported height at 23: $r = -.08, p < .001, n = 5{,}835$) and the measure of dishonesty (the absolute value of the difference between their reported height at 42 and their interviewer-measured height at 33: $r = -.06, p < .001, n = 5{,}884$). So, more intelligent individuals appeared to be both more accurate in their recall and more honest in their responses.[3] I entered the proxy measures of recall inaccuracy and dishonesty in the multiple regression equation.

As with the measures of respondents' ability to assess their own true levels of subjective well-being, these were very indirect and oblique measures of recall inaccuracy and dishonesty. In particular, it is important to note that, at each sweep, NCDS asked its respondents to state what they believed to be their current height and the respondents were not specifically reminded or instructed to be consistent between sweeps. However, as before, it was virtually impossible to measure recall inaccuracy or dishonesty in survey data, because I did not have access to respondents' true levels of subjective well-being at any sweep. Furthermore, I hasten to add that recall inaccuracy and dishonesty could *increase* life-course variability in subjective well-being *only if* inaccurate and/or dishonest respondents recorded their subjective well-being *randomly with respect to true levels* at each wave. If inaccurate and/or dishonest respondents *consistently overestimated or underestimated* their true levels of subjective well-being *by the same margin*, then their recall inaccuracy and dishonesty did not necessarily increase the measure of life-course variability in subjective well-being.

### Sample attrition

As with any other longitudinal surveys, particularly ones that have been going on for more than half a century, sample attrition bias was a potential problem with the NCDS.

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[3] *There was other, more direct evidence that more intelligent individuals were more honest in their survey responses. In Wave IV of the National Longitudinal Study of Adolescent Health (Add Health), the interviewer first asked the respondents to report their height and weight, and then,* later on the same day, *objectively measured their height with a tape measure and their weight with a digital bathroom scale. Add Health respondents' childhood general intelligence, measured by Peabody Picture Vocabulary Test at Waves I and III, was significantly negatively correlated with the absolute value of the difference between self-report and interviewer-measured values both in height (*$r = -.08, p < .001, n = 11{,}915$*) and weight (*$r = -.08, p < .001, n = 11{,}697$*).*

Table 1 compares the full sample with the restricted sample that was used in the analysis in this paper, which essentially consisted of respondents who had participated in all eight sweeps over 50 years, on the four measures of subjective well-being and childhood IQ.

A comparison of the descriptive statistics from the two samples showed that, even though the restricted sample was smaller than the full sample, the mean, standard deviation, and skewness behaved in the same way in both samples. For example, in both samples, the mean subjective well-being decreased from 33 to 42, increased from 42 to 47, and again decreased from 47 to 51. Conversely, the standard deviation increased from 33

**Table 1.** Comparison of full and restricted samples

| Full sample | | | | |
|---|---|---|---|---|
| **Descriptive statistics** | | | | |
| | *n* | Mean | *SD* | Skewness |
| Subjective well-being at 33 | 10,629 | 7.42 | 1.72 | −1.03 |
| Subjective well-being at 42 | 11,269 | 7.29 | 1.92 | −1.13 |
| Subjective well-being at 47 | 9,510 | 7.57 | 1.49 | −1.14 |
| Subjective well-being at 51 | 9,632 | 7.29 | 1.85 | −1.10 |
| Childhood IQ | 9,084 | 100.00 | 15.00 | −.28 |
| **Correlation matrix** | | | | |
| | SWB@33 | SWB@42 | SWB@47 | SWB@51 |
| Subjective well-being at 33 | | | | |
| Subjective well-being at 42 | .42 | | | |
| Subjective well-being at 47 | .39 | .46 | | |
| Subjective well-being at 51 | .38 | .43 | .53 | |
| Childhood IQ | .06 | .07 | .04 | .08 |
| **Restricted sample** | | | | |
| **Descriptive statistics** | | | | |
| | *n* | Mean | *SD* | Skewness |
| Subjective well-being at 33 | 6,958 | 7.52 | 1.64 | −1.07 |
| Subjective well-being at 42 | 7,243 | 7.39 | 1.81 | −1.18 |
| Subjective well-being at 47 | 7,273 | 7.63 | 1.43 | −1.62 |
| Subjective well-being at 51 | 7,241 | 7.35 | 1.80 | −1.15 |
| Childhood IQ | 4,488 | 103.01 | 13.78 | −.31 |
| **Correlation matrix** | | | | |
| | SWB@33 | SWB@42 | SWB@47 | SWB@51 |
| Subjective well-being at 33 | | | | |
| Subjective well-being at 42 | .42 | | | |
| Subjective well-being at 47 | .39 | .46 | | |
| Subjective well-being at 51 | .38 | .44 | .53 | |
| Childhood IQ | .06 | .07 | .04 | .09 |

*Note.* All correlations are significant at $p < .001$ (two-tailed), unadjusted for multiple comparisons.

to 42, decreased from 42 to 47, and again increased from 47 to 51. The magnitude of changes in both statistics between waves was similar in the two samples. However, consistent with earlier studies (Madhyastha, Hunt, Deary, Gale, & Dykiert, 2009), NCDS respondents who had participated in all waves were more intelligent than respondents in the full sample (103.01 vs. 100.00, $t(9082) = 19.25$, $p < .001$).

A comparison of the correlation matrices for the full and restricted samples further showed that the associations among the four measures of subjective well-being and childhood general intelligence were virtually identical in both samples. This suggested that sample attrition and the use of the restricted sample rather than the full sample might not have biased the estimate of the association between childhood general intelligence and the life-course variability in subjective well-being.

Nevertheless, sample attrition at each wave was not random. Those who were happier at one sweep were significantly more likely to participate in the subsequent sweep than those who were less happy (Sweep 5 vs. Sweep 6: 7.47 vs. 7.08, $t(10627) = 7.85$, $p < .001$; Sweep 6 vs. Sweep 7: 7.33 vs. 7.09, $t(11267) = 5.45$, $p < .001$; Sweep 7 vs. Sweep 8: 7.60 vs. 7.37, $t(9508) = 4.88$, $p < .001$). And those who were more intelligent at one sweep were significantly more likely to participate in the subsequent sweep than those who were less intelligent (Sweep 5 vs. Sweep 6: 101.62 vs. 97.11, $t(6737) = 8.38$, $p < .001$; Sweep 6 vs. Sweep 7: 102.22 vs. 96.05, $t(6714) = 13.75$, $p < .001$; Sweep 7 vs. Sweep 8: 102.61 vs. 98.25, $t(5734) = 7.47$, $p < .001$).

And NCDS respondents who dropped out also appeared to be more variable in their subjective well-being over time than those who persisted in their survey participation. For example, respondents who participated in the first seven sweeps of NCDS but dropped out before Sweep 8 had significantly higher variance in subjective well-being at 33, 42, and 47 than those who continued to participate in Sweep 8 (1.98 vs. 1.58, $t(8105) = 3.54$, $p < .001$). Because respondents who dropped out of participation in NCDS at each sweep appeared to be simultaneously less intelligent and more variable in their subjective well-being, their inclusion would have further *strengthened* the negative association between childhood general intelligence and life-course variability in happiness, and thus my use of the restricted sample with attrition produced a *conservative* estimate of the association.

### *Analytic strategy*

I analysed the life-course variability in subjective well-being as well as in job and relationship satisfaction with OLS regression. More sophisticated techniques specifically designed for multi-wave longitudinal data like NCDS, such as the STARTS model (Kenny & Zautra, 2001) used by Lucas and Donnellan (2007), were not appropriate for my purposes of establishing an association between childhood general intelligence and life-course variability in happiness net of a large number of potential confounds. The STARTS model decomposes the longitudinal variation in individual subjective well-being into *S*table *T*rait, *A*uto*R*egressive *T*rait, and *S*tate, the last of which must necessarily remain unexplained because it is indistinguishable from measurement errors. Other techniques like the growth curve models were not suitable because they analysed the mean levels rather than variabilities, and still others like the fixed-effects models were infeasible here because I used all four repeated measures of subjective well-being to construct one indicator of life-course variability. I used listwise deletion of cases for missing data. However, none of my substantive conclusions below changed if I instead used pairwise deletion.

## Results

### *Measures of subjective well-being, job and relationship satisfaction*

As Table 2 shows, the five alternative measures of variability in happiness were all very highly correlated with each other. I therefore entered them in a factor analysis to compute a latent factor for variability. The procedure extracted only one factor, and all five measures loaded very heavily on it (factor loadings: variance = .94; maximum absolute difference = .94; sum of absolute values of movements = .95; sum of squared movements = .94; coefficient of variation = .87). I used the latent factor for the life-course variability in subjective well-being as the dependent variable in the subsequent analyses. However, all of my substantive conclusions below remained identical if I used any of the five constituent measures of variability.

I have similarly extracted a latent factor in life-course variability in job and relationship satisfaction via factor analysis from the five measures each of their variability. In both cases, the factor analysis extracted only one latent factor and all five measures loaded extremely heavily on it (job satisfaction: variance = .94; maximum absolute difference = .97; sum of absolute values of movements = .92; sum of squared movements = .93; coefficient of variation = .94; relationship satisfaction: variance = .96; maximum absolute difference = .98; sum of absolute movements = .95; sum of squared movements = .95; coefficient of variation = .94).

Figure 1 presents the distribution of the NCDS respondents by their raw score on the second constituent measure of variability in subjective well-being (maximum absolute difference). The figure largely confirmed the earlier findings that most individuals' levels of happiness were very stable. It showed that 8.6% of the respondents maintained exactly the same level of happiness in four survey sweeps over 18 years from Ages 33 to 51. Nearly 70% (68.9%) remained within 2 points on a 11-point scale. The absolute-agreement intraclass correlation coefficient for the measure of subjective well-being at 33, 42, 47, and 51 was .75 (two-way mixed effects model, average measures).

### *The relationship between the mean and the variability*

The mean of the mean life satisfaction scores from Ages 33, 42, 47, and 51 was 7.47, with a standard deviation of 1.27. The NCDS data therefore largely confirmed Diener and Diener's (1996) observation that 'most people are happy'. The correlation between the mean and the variability was significantly negative ($r = -.46, p < .001, n = 7{,}276$), eerily similar in magnitude to the same correlation from the German Socio-Economic Panel ($r = -.47, p < .05, n = 3{,}608$; (Fujita & Diener, 2005, p. 160). Happier individuals were more stable in their level of happiness over 18 years than less happy individuals.

**Table 2.** Correlation matrix for the five measures of life-course variability of subjective well-being

| | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| (1) Variance | .90 | .81 | .90 | .74 |
| (2) Absolute difference | | .89 | .81 | .76 |
| (3) Sum of changes | | | .89 | .80 |
| (4) Sum of squared changes | | | | .78 |
| (5) Coefficient of variation | | | | |

*Note.* All correlations are significant at $p < .001$ (two-tailed), unadjusted for multiple comparisons.

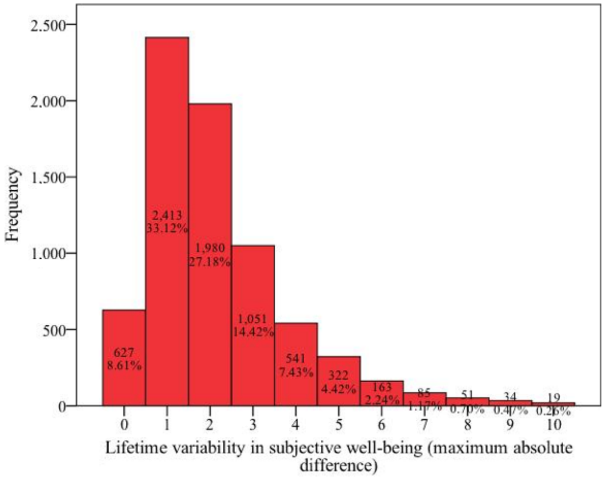


**Figure 1.** Frequency distribution of lifetime variability in subjective well-being (maximum absolute difference).

Now the measure of life-course variability constructed above via factor analysis used the coefficient of variation as one of the five indicators, and the coefficient of variation is a ratio of the standard deviation to the mean. So the measure of life-course variability was not entirely independent of the mean. This, however, was not the reason for the significant negative correlation. When I constructed another measure of life-course variability of life satisfaction only with the other four indicators of variability, none of which contained the mean, the correlation still remained about the same ($r = -.42$, $p < .001$, $n = 7{,}281$),

Even though most people were happy, with their mean life satisfaction score near the top of the scale, the negative correlation between the mean and the variability was not a consequence of the ceiling effect, where those in the extreme high end of the scale did not have much room to move up. When I limited the sample to those whose mean life satisfaction score was 9.0 or lower, the correlation was still significantly negative ($r = -.45, p < .001, n = 6{,}789$). The same was true when I further restricted the sample to those whose mean was 8.0 or lower ($r = -.43$, $p < .001$, $n = 5{,}023$), 7.0 or lower ($r = -.28, p < .001, n = 2{,}414$) or 6.0 or lower ($r = -.18, p < .001, n = 1{,}026$). This was exactly what Fujita and Diener (2005) found with their German data.

It therefore appeared the negative correlation between the mean and the variability of life satisfaction was robust. Happier individuals were more stable in their happiness over time; less happy individuals were more variable in their happiness over time.

### *Multiple regression analyses*

Life-course variability in life satisfaction was significantly negatively correlated with childhood general intelligence ($r = -20$, $p < .001$, $n = 4{,}484$), as well as all Big Five personality factors except for Agreeableness (Openness: $r = -.05, p < .001, n = 6{,}470$; Conscientiousness: $r = -.08$, $p < .001$, $n = 6{,}447$; Extraversion: $r = -.06$, $p < .001$, $n = 6{,}531$; Agreeableness: $r = .02$, $p = .090$, $n = 6{,}517$; Emotional stability: $r = -.17$, $p < .001$, $n = 6{,}509$). This was contrary to the earlier finding by Eid and Diener (1999,

**Table 3.** Correlates of life-course variability in relationship satisfaction and job satisfaction

| | (1) Subjective well-being | (2) Job satisfaction | (3) Relationship satisfaction |
|---|---|---|---|
| Childhood intelligence | −.02*** | −.01** | −.01*** |
| | (.00) | (.00) | (.00) |
| | *−.20* | *−.06* | *−.11* |
| Sex (Male = 1) | −.15*** | .08* | −.03 |
| | (.04) | (.04) | (.04) |
| | *−.07* | *.04* | *−.02* |
| Big Five | | | |
| Openness | .01* | .01*** | .00 |
| | (.00) | (.00) | (.00) |
| | *.04* | *.07* | *.00* |
| Conscientiousness | −.01*** | −.01** | .00 |
| | (.00) | (.00) | (.00) |
| | *−.06* | *−.06* | *.02* |
| Extraversion | −.00 | −.00 | .01 |
| | (.00) | (.00) | (.00) |
| | *−.02* | *−.02* | *.04* |
| Agreeableness | −.00 | .00 | −.01 |
| | (.00) | (.00) | (.00) |
| | *−.01* | *.00* | *−.04* |
| Emotional stability | −.02*** | −.02*** | −.01** |
| | (.00) | (.00) | (.00) |
| | *−.12* | *−.11* | *−.05* |
| Constant | 2.37 | .88 | 1.08 |
| | (.18) | (.20) | (.20) |
| $R^2$ | .07 | .02 | .02 |
| Number of cases | 3,780 | 3,369 | 3,370 |

*Note.* Main entries are unstandardized regression coefficients.
Entries in parentheses are standard errors.
Entries in italics are standardized regression coefficients.
$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$ (two-tailed), unadjusted for multiple comparisons.

p. 670; table 5), who found that the standard deviation in happiness was not significantly correlated with any of the Big Five personality factors.

Table 3, Column 1, presents the results of OLS multiple regression analysis, regressing the life-course variability in life satisfaction on childhood intelligence, sex (0 = female; 1 = male), and the Big Five personality factors. It shows that more intelligent individuals were significantly more stable in their life satisfaction over 18 years. Similarly, men were significantly more stable in their life satisfaction than women. Among the Big Five personality factors, Openness, Conscientiousness, and Emotional stability were significantly associated with life-course variability in life satisfaction. Net of other variables in the equation, more open individuals were more variable, whereas more conscientious and more emotionally stable individuals were less variable, in their life satisfaction. A comparison of the standardized regression coefficients in Table 3, Column 1, suggested that childhood general intelligence was the strongest predictor of life-course variability in life satisfaction from Ages 33 to 51.

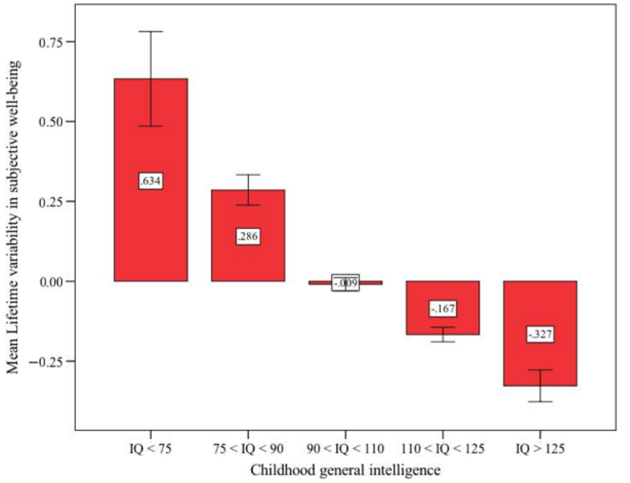


**Figure 2.** Bivariate association between childhood general intelligence and lifetime variability in subjective well-being.

One possible objection to this conclusion is that childhood general intelligence, constructed via factor analysis from 11 different cognitive tests administered at three different ages, was measured more precisely than Big Five personality factors, measured via 10 questions per factor at one point in time at 51. In general, the reliability of measures of intelligence is greater than that of personality measures. To address this criticism, I entered the raw score from each of the 11 individual IQ tests one at a time in lieu of the childhood general intelligence factor. These additional analyses showed that six of the seven IQ tests administered at 11 and 16 (all except for Copying Designs at 11) were still more strongly associated with the life-course variability in subjective well-being than any of the Big Five personality factors. Therefore, the conclusion did not appear to be an artefact of the more precise measurement of intelligence.

Figure 2 presents the bivariate association between childhood general intelligence (categorized into five ‘cognitive classes’) and the life-course variability of life satisfaction (which had a mean of 0 and a standard deviation of 1). It shows that there was a very strong and monotonically negative association between childhood general intelligence and the life-course variability in life satisfaction. The two extreme categories of childhood general intelligence – those with IQs below 75 and those with IQs above 125 – were separated by nearly one full standard deviation in the life-course variability in life satisfaction.

### *Similarities with job and relationship satisfaction*

Table 3, Columns 2 and 3, presents the results of multiple regression analyses for the life-course variabilities in job satisfaction and relationship satisfaction. They show that childhood general intelligence was negatively associated with the life-course variability in both, as it was with subjective well-being. This was remarkable in that, with the sole exception of Emotional stability, no other variable included in the equation had a comparable association with both. Men were more variable in their job satisfaction, but not in relationship satisfaction; Openness was positively, and Conscientiousness negatively, associated with the variability in job satisfaction, but neither was significantly associated with variability in relationship satisfaction. Only childhood general intelligence and

**Table 4.** Correlates of life-course variability in subjective well-being, net of all the control variables entered en masse

| | |
|---|---|
| Childhood intelligence | −.01*** |
| | (.00) |
| | *−.08* |
| Sex (Male = 1) | −.10** |
| | (.03) |
| | *−.05* |
| Big Five | |
| Openness | −.00 |
| | (.00) |
| | *−.02* |
| Conscientiousness | −.00 |
| | (.00) |
| | *−.00* |
| Extraversion | .00 |
| | (.00) |
| | *.03* |
| Agreeableness | .00 |
| | (.00) |
| | *.01* |
| Emotional stability | .00 |
| | (.00) |
| | *.01* |
| Control variables | |
| Education | .01 |
| | (.01) |
| | *.01* |
| Earnings at 33 | −.00 |
| | (.00) |
| | *−.01* |
| Self-rated health | .04* |
| | (.02) |
| | *.04* |
| Currently married at 33 | −.10** |
| | (.04) |
| | *−.05* |
| Currently married at 42 | .00 |
| | (.05) |
| | *.00* |
| Currently married at 47 | .11 |
| | (.06) |
| | *.05* |
| Currently married at 51 | −.02 |
| | (.05) |
| | *−.01* |
| Mean subjective well-being | −.13*** |
| | (.02) |
| | *−.16** |
| Prediction error at 33 | (.01) |
| | *.43* |

*Continued*

**Table 4** (*Continued*)

| | |
|---|---|
| Prediction error at 42 | .20*** |
| | (.01) |
| | *.30* |
| Recall inaccuracy | .01 |
| | (.01) |
| | *.03* |
| Dishonesty | .00 |
| | (.01) |
| | *−.00* |
| Constant | .82 |
| | (.21) |
| $R^2$ | .49 |
| Number of cases | 2,559 |

*Note*. Main entries are unstandardized regression coefficients.
Entries in parentheses are standard errors.
Entries in italics are standardized regression coefficients.
**p* < .05; ***p* < .01; ****p* < .001 (two-tailed), unadjusted for multiple comparisons.

Emotional stability were consistently negatively associated with the life-course variability in job satisfaction and relationship satisfaction as well as in subjective well-being.

### *Tests of hypotheses*

Table 4 presents the results of the multiple regression analysis with all of the control variables discussed above, as well as childhood general intelligence, sex, and Big Five personality factors, as predictors of life-course variability in subjective well-being. The regression model presented in Table 4 simultaneously tested all the hypotheses regarding the negative association between childhood general intelligence and life-course variability in subjective well-being. It shows that, even net of education, earnings at 33, lifetime measure of self-rated health, whether currently married at 33, 42, 47, and 51, lifetime mean subjective well-being, prediction errors at 33 and 42, and measures of recall inaccuracy and dishonesty, as well as sex and Big Five personality factors, childhood general intelligence was significantly negatively associated with life-course variability in subjective well-being ($b = -.01, p < .001$, standardized coefficient = −.08).

With the additional control variables, *none* of the Big Five personality factors was now significantly associated with life-course variability in subjective well-being. Curiously, the lifetime measure of self-rated health was *positively* associated with life-course variability in subjective well-being; healthier individuals were *more* variable in their subjective well-being over 18 years. However, this was an artefact of the fact that lifetime mean subjective well-being was included in the equation. When it was excluded, lifetime self-rated health was no longer significantly associated with the life-course variability in subjective well-being.

As expected, being married at 33 (although not at other ages) and mean subjective well-being were both significantly negatively associated with life-course variability in subjective well-being. Both prediction errors at 33 and 42 were significantly and very strongly positively associated with life-course variability in subjective well-being. No other variables included in the multiple regression equation presented in Table 4 were significantly associated with the dependent variable. A comparison of standardized regression coefficients suggested that, apart from mean subjective well-being and prediction errors at 33 and 42, childhood general intelligence was most strongly associated with life-course variability, although its association was quite small. All the variables included in the equation together explained nearly half the variance in life-course variability in subjective well-being ($R^2 = .49$).

Simultaneous mediation analysis, treating all the variables in the multiple regression model presented in Table 4 as potential mediators, showed that self-rated health, mean subjective well-being, prediction error at 33, and prediction error at 42 all partially mediated the effect of childhood general intelligence on life-course variability in subjective well-being (standardized partial effect of childhood general intelligence on the mediator: self-rated health = .13, $p < .001$; mean subjective well-being = −07, $p < .001$; prediction error at 33 = −.10, $p < .001$; prediction error at 42 = −.07, $p < .01$). Technically, sex also met the formal criterion for partial mediation, but it would be unreasonable to posit that childhood general intelligence affected respondent's sex.

## Discussion

### *Limitations of the current study*

A major limitation of the current study was that three of the measures used to rule out potential explanations for the negative association between childhood general intelligence and the life-course variability in subjective well-being were very indirect and oblique. In order directly to measure respondents' ability to assess their own true levels of happiness, their recall accuracy, and their dishonesty, I would have needed direct access to their true levels of subjective well-being apart from their verbal responses to the survey questions. Just like any other user of survey data, I did not have such access, and I was at the mercy of the recorded verbal responses of the respondents. As a result, I was forced to employ proxy measures from what information was available in the data. I used the inaccuracies of predictions of future levels of subjective well-being as proxies for respondents' concurrent ability to assess their true level of happiness, the discrepancy in their self-reported height at 23 and 42 as a proxy for their recall accuracy, and the discrepancy between their self-reported height at 42 and interviewer-measured height at 33 as a proxy for their dishonesty. Admittedly, all of these proxies were oblique and indirect at best, and my ability to rule out the associated alternative explanations was correspondingly compromised. It was simply the best I could do with the current survey data. Appropriate caution is necessary in interpreting the conclusion regarding the associated explanations.

Another limitation of the study was that respondents' subjective well-being in the NCDS was measured in each sweep with only one 11-point Likert scale. In many sweeps, however, the NCDS also measured respondents' job satisfaction and relationship satisfaction, two of the major components of global life satisfaction. As the results presented in Table 3 show, while different factors affected variability in subjective well-being, job satisfaction, and relationship satisfaction, childhood general intelligence (and Emotional stability) were negatively associated with all three.

Yet another limitation of the study was that the measures of the Big Five personality factors were taken only once, at the very last sweep available (at 51). The relative strength of the association with the life-course stability of subjective well-being between childhood general intelligence and Big Five personality factors (presented in Table 3) might well have been different had Big Five personality factors been measured multiple times over time, as childhood general intelligence was.

Given these limitations of the study, extreme caution is necessary in interpreting the results of the current study, especially as the statistically significant association between childhood general intelligence and life-course variability in subjective well-being was relatively small and could well have been produced by unmeasured factors. The findings of the current study may be limited to the particular sample, the particular birth cohort (born in 1958), or the particular location (in the United Kingdom). Further research, with much more precise and repeated measures of the Big Five personality factors and from different birth cohorts and geographical locations, will be necessary to replicate the current findings.

### *Summary*

The life-course variability of subjective well-being – how stable their happiness was over the life course – was negatively associated with its mean; happier individuals were more stable in their happiness. Men were significantly more stable in their happiness than women. The life-course variability was negatively associated with childhood general intelligence and all Big Five personality factors, except for Agreeableness. In a multiple regression analysis, childhood general intelligence emerged as the strongest predictor of the life-course variability of happiness. More intelligent children on average tended to grow up to be more stable in their subjective well-being throughout adulthood.

But why were more intelligent individuals more stable in their happiness than less intelligent individuals? The available data allowed me tentatively to test and provisionally rule out several hypotheses. The analyses presented above appeared to suggest that it was not because they were more educated and made more money (even though they were more educated and did make more money); it was not because they were healthier (even though they were); it was not because they were more stable in their marital status (even though they were); it was not because they were happier (even though they were); it was not because they were better able to assess their own level of happiness more accurately (even though they were better able to predict their level of happiness in the future); and it was not because they were better able to recall their previous responses to the same question or because they were more honest in their survey responses (even though they were both). The available evidence presented above seemed to suggest that these might not have been entirely the reasons that more intelligent individuals were more stable in their life satisfaction over the life course; however, I did not know what was. Why more intelligent children might have grown up to be more stable in their happiness in their adulthood remained a mystery.

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## References

Ali, A., Ambler, G., Strydom, A., Rai, D., Cooper, C., McManus, S.,… Hassiotis, A. (2013). The relationship between happiness and intelligent quotient: The contribution of socio-economic and clinical factors. *Psychological Medicine*, *43*, 1303–1312. doi:10.1017/S0033291712002139

Baird, B. M., Lucas, R. E., & Donnellan, M. B. (2010). Life satisfaction across the lifespan: Findings from two nationally representative panel studies. *Social Indicators Research*, *99*, 183–203. doi:10.1007/s11205-010-9584-9

Batty, G. D., Deary, I. J., & Gottfredson, L. S. (2007). Premorbid (early life) IQ and later mortality risk: Systematic review. *Annals of Epidemiology*, *17*, 278–288. doi:10.1016/j.annepidem.2006.07.010

Brown, W. W., & Reynolds, M. O. (1975). A model of IQ, occupation, and earnings. *American Economic Review*, *65*, 1002–1006.

Diener, E., & Diener, C. (1996). Most people are happy. *Psychological Science*, *7*, 181–185.doi:10.1111/j.1467-9280.1996.tb00354.x

Diener, E., Diener, M., & Diener, C. (1995). Factors predicting the subjective well-being of nations. *Journal of Personality and Social Psychology*, *69*, 851–864. doi:10.1037//0022-3514.69.5.851

Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, *29*, 94–122. doi:10.1016/j.joep.2007.09.001

Eid, M., & Diener, E. (1999). Intraindividual variability in affect: Reliability, validity, and personality correlates. *Journal of Personality and Social Psychology*, *76*, 62–676. doi:10.1037//0022-3514.76.4.662

Ferriss, A. L. (2002). Religion and the quality of life. *Journal of Happiness Studies*, *3*, 199–215.

Fujita, F., & Diener, E. (2005). Life satisfaction set point: Stability and change. *Journal of Personality and Social Psychology*, *88*, 158–164. doi:10.1037/0022-3514.88.1.158

Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment*, *4*, 26–42.

Goldberg, P., Gueguen, A., Schmaus, A., Nakache, J. P., & Goldberg, M. (2001). Longitudinal study of associations between perceived health status and self reported diseases in the French Gazel cohort. *Journal of Epidemiology and Community Health*, *55*, 233–238. doi:10.1136/jech.55.4.233

Gottfredson, L. S., & Deary, I. J. (2004). Intelligence predicts health and longevity, but why? *Current Directions in Psychological Science*, *13*, 1–4. doi:10.1111/j.0963-7214.2004.01301001.x

Haring-Hidore, M., Stock, W. A., Okun, M. A., & Witter, R. A. (1985). Marital status and subjective well-being: A research synthesis. *Journal of Marriage and the Family*, *47*, 947–953. doi:10.2307/352338

Holley, P., Yabiku, S., & Benin, M. (2006). The relationship between intelligence and divorce. *Journal of Family Issues*, *27*, 1723–1748. doi:10.1177/0192513X06291887

Isaacowitz, D. M., & Smith, J. (2003). Positive and negative affect in very old age. *Journal of Gerontology: Psychological Sciences*, *58B*, 143–152.

Kanazawa, S. (2006). Mind the gap … in intelligence: Reexamining the relationship between inequality and health. *British Journal of Health Psychology*, *11*, 623–642. doi:10.1348/135910705X69842

Kaplan, G., & Camacho, T. (1983). Perceived health and mortality: A nine-year follow-up of the human population laboratory cohort. *American Journal of Epidemiology*, *117*, 292–304.

Kenny, D. A., & Zautra, A. (2001). Trait-state models for longitudinal data. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change* (pp. 243–263). Washington DC: American Psychological Association. doi:10.1037/10409-008

Layes, A., Asada, Y., & Kephart, G. (2012). Whiners and deniers – What does self-rated health measure? *Social Science and Medicine*, *75*, 1–9. doi:10.1016/j.socscimed.2011.10.030

Lucas, R. E. (2007). Adaptation and the set-point model of subjective well-being: Does happiness change after major life events? *Current Directions in Psychological Science*, *16*, 75–80. doi:10.1111/j.1467-8721.2007.00479.x

Lucas, R. E., & Donnellan, M. B. (2007). How stable is happiness? Using the STARTS model to estimate the stability of life satisfaction. *Journal of Research in Personality*, *41*, 1091–1098. doi:10.1016/j.jrp.2006.11.005

Lykken, D., & Tellegen, A. (1996). Happiness is a stochastic phenomenon. *Psychological Science*, *7*, 186–189. doi:10.1111/j.1467-9280.1996.tb00355.x

Lynn, R., Hampson, S., & Magee, M. (1984). Home background, intelligence, personality and education as predictors of unemployment in young people. *Personality and Individual Differences*, *5*, 549–557. doi:10.1016/0191-8869(84)90029-1

Lynn, R., & Vanhanen, T. (2006). *IQ and global inequality*. Augusta: Washington Summit Publishers.

Madhyastha, T. M., Hunt, E., Deary, I. J., Gale, C. R., & Dykiert, D. (2009). Recruitment modelling applied to longitudinal studies of group differences in intelligence. *Intelligence*, *37*, 422–427. doi:10.1016/j.intell.2009.04.001

Miller, N. R. (1986). Information, electorates, and democracy: Some extensions and interpretations of the Condorcet jury theorem. In B. Grofman & G. Owen (Eds.), *Information pooling and group decision making: Proceedings of the Second University of California, Irvine, conference on political economy* (pp. 173–192). Greenwich: JAI Press.

Mossey, J. M., & Shapiro, E. (1982). Self-rated health: a predictor of mortality among the elderly. *American Journal of Public Health*, *72*, 800–808. doi:10.2105/AJPH.72.8.800

Mroczek, D., & Spiro, A., III (2003). Modeling intraindividual change in personality traits: Findings from the Normative Aging Study. *Journal of Gerontology: Psychological Sciences*, *58B*, 153–165.

Mroczek, D., & Spiro, A., III (2005). Changes in life satisfaction during adulthood: Findings from the Veterans Affairs normative aging study. *Journal of Personality and Social Psychology.*, *88*, 189–202. doi:10.1037/0022-3514.88.1.189

Nagoshi, C. T., Johnson, R. C., & Honbo, K. A. M. (1993). Family background, cognitive abilities, and personality as predictors of educational and occupational attainment across two generations. *Journal of Biosocial Science*, *25*, 259–276.

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality and Quantity*, *41*, 673–690. doi:10.1007/s11135-006-9018-6

Okun, M. A., Stock, W. A., Haring, M. J., & Witter, R. A. (1984). Health and subjective well-being: A meta-analysis. *International Journal of Aging and Human Development*, *19*, 111–132. doi:10.2190/QGJN-0N81-5957-HAQD

O'Toole, B. I. (1990). Intelligence and behaviour and motor vehicle accident mortality. *Accident Analysis and Prevention*, *22*, 211–221. doi:10.1016/0001-4575(90)90013-B

Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin*, *126*, 3–25. doi:10.1037/0033-2909.126.1.3

Schimmack, U., & Oishi, S. (2005). The influence of chronically and temporarily accessible information on life satisfaction judgments. *Journal of Personality and Social Psychology*, *89*, 395–406. doi:10.1037/0022-3514.89.3.395

Siedlecki, K. L., Tucker-Drob, E. M., Oishi, S., & Salthouse, T. A. (2008). Life satisfaction across adulthood: Different determinants at different ages? *Journal of Positive Psychology*, *3*, 153–164.

Sigelman, L. (1981). Is ignorance bliss? A reconsideration of the folk wisdom. *Human Relations*, *34*, 965–974. doi:10.1177/001872678103401104

Smith, D. I., & Kirkham, R. W. (1982). Relationship between intelligence and driving record. *Accident Analysis and Prevention*, *14*, 439–442. doi:10.1016/0001-4575(82)90057-4

Snow, R. E., & Yalow, E. (1982). Education and intelligence. In R. J. Sternberg (Ed.), *Handbook of human intelligence* (pp. 493–585). Cambridge, UK: Cambridge University Press.

Stevenson, B., & Wolfers, J. (2009). The paradox of declining female happiness. *American Economic Journal: Economic Policy*, *1*, 190–225. doi:10.1257/pol.1.2.190

Unsworth, N. (2010). On the division of working memory and long-term memory and their relation to intelligence: A latent variable approach. *Acta Psychologica*, *134*, 16–28. doi:10.1016/j.actpsy.2009.11.010

Watten, R. G., Syversen, J. L., & Myhrer, T. (1995). Quality of life, intelligence and mood. *Social Indicators Research*, *36*, 287–299. doi:10.1007/BF01078818

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## Appendix: Mean, standard deviations, and correlation matrix

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | – | −.22 | −.07 | −.07 | −.09 | −.07 | −.02 | −.19 | −.17 | −.04 | −.21 | −.09 | −.14 | −.14 | −.16 | −.48 | .62 | .51 | .04 | .02 |
| (2) | −.20*** | – | .02 | .39 | .11 | .07 | .15 | .13 | .66 | .06 | .28 | .03 | .08 | .09 | .09 | .12 | −.18 | −.16 | −.09 | −.07 |
| (3) | −.06*** | .01 | – | .04 | −.09 | −.05 | −.40 | .14 | .06 | .33 | .04 | −.04 | −.01 | .01 | .02 | −.02 | −.03 | −.07 | .02 | .02 |
| (4) | −.05*** | .36*** | .03* | – | .25 | .40 | .34 | .10 | .33 | .06 | .13 | −.03 | −.02 | −.01 | −.01 | .08 | −.04 | −.06 | −.03 | −.02 |
| (5) | −.08*** | .10*** | −.10*** | .25*** | – | .16 | .28 | .21 | .10 | .02 | .24 | .05 | .07 | .07 | .09 | .24 | −.07 | −.13 | −.02 | .00 |
| (6) | −.06*** | .05*** | −.06*** | .40*** | .16*** | – | .35 | .24 | .08 | .05 | .14 | .05 | .03 | .03 | .04 | .20 | −.07 | −.06 | −.02 | −.02 |
| (7) | −.02 | .15*** | −.38*** | .34*** | .28*** | .35*** | – | .05 | .12 | −.15 | .08 | .06 | .04 | .02 | .02 | .12 | −.02 | −.04 | −.02 | −.01 |
| (8) | −.17*** | .11*** | .13*** | .09*** | .21*** | .23*** | .06*** | – | .12 | .06 | .34 | .05 | .05 | .05 | .05 | .35 | −.17 | −.22 | −.02 | −.01 |
| (9) | −.15*** | .64*** | .06*** | .31*** | .09*** | .08*** | .11*** | .10*** | – | .05 | .25 | .05 | .09 | .10 | .09 | .11 | −.16 | −.15 | −.06 | −.04 |
| (10) | −.05*** | .13*** | .18*** | .07*** | .02 | .03* | −.06*** | .06*** | .05*** | – | .09 | −.01 | −.02 | .02 | .03 | .06 | −.00 | −.05 | −.01 | .00 |
| (11) | −.19*** | .24*** | .03* | .10*** | .22*** | .13*** | .07*** | .33*** | .22*** | .06*** | – | .08 | .10 | .10 | .11 | .40 | −.22 | −.21 | −.05 | −.04 |
| (12) | −.09*** | .02 | −.04*** | −.05*** | .04*** | .04*** | .05*** | .04** | .04*** | −.01 | .06*** | – | .56 | .49 | .42 | .23 | −.07 | −.06 | −.02 | −.02 |
| (13) | −.13*** | .07*** | .01 | −.04** | .06*** | .03** | .03* | .04*** | .07*** | −.01 | .08*** | .55*** | – | .77 | .65 | .27 | −.16 | −.08 | −.03 | −.02 |
| (14) | −.13*** | .08*** | .02 | −.02* | .06*** | .03** | .02 | .04*** | .06*** | .03* | .08*** | .48*** | .76*** | – | .81 | .29 | −.16 | −.10 | −.03 | −.02 |
| (15) | −.14*** | .08*** | .02 | −.02* | .08*** | .03** | .02 | .04*** | .07*** | .03** | .09*** | .41*** | .64*** | .80*** | – | .32 | −.16 | −.15 | −.02 | −.02 |
| (16) | −.46*** | .08*** | −.04** | .07*** | .23*** | .19*** | .12*** | .34*** | .09*** | .05*** | .38*** | .22*** | .26*** | .28*** | .31*** | – | −.50 | −.42 | −.01 | −.01 |
| (17) | .61*** | −.16*** | −.03** | −.02 | −.07*** | −.07*** | −.01 | −.16*** | −.14*** | −.01 | −.20*** | −.05*** | −.15*** | −.15*** | −.14*** | −.49*** | | .28 | .03 | .02 |
| (18) | .50*** | −.14*** | −.07*** | −.05*** | −.12*** | −.06*** | −.03** | −.21 | −.13*** | −.05*** | −.19*** | −.05*** | −.07*** | −.09*** | −.14*** | −.40*** | .27*** | – | .01 | .01 |
| (19) | .04*** | −.08*** | .02 | −.02 | −.02 | −.02 | −.02 | −.02 | −.05*** | −.01 | −.05*** | −.01 | −.03* | −.03* | −.02 | −.01 | .02* | .01 | | .61 |
| (20) | .03*** | −.06*** | .02* | −.02 | .00 | −.02 | −.01 | −.01 | −.04*** | −.00 | −.03** | −.02 | −.02 | −.02 | −.02 | −.01 | .02 | .01 | .62*** | |
| Mean | .00 | 100.00 | .49 | 32.47 | 33.72 | 29.35 | 36.78 | 28.42 | 2.23 | 9.05 | .00 | .71 | .71 | .71 | .69 | 7.47 | 1.67 | 1.47 | 1.66 | 2.12 |
| *Mean* | *.06* | *99.75* | *.49* | *32.18* | *33.57* | *29.23* | *36.60* | *28.24* | *2.18* | *10.31* | *−.07* | *.70* | *.69* | *.69* | *.67* | *7.38* | *1.71* | *1.52* | *1.70* | *2.16* |
| SD | 1.00 | 15.00 | .50 | 5.27 | 5.46 | 6.68 | 5.36 | 7.27 | 1.43 | 72.27 | 1.00 | .46 | .45 | .45 | .46 | 1.27 | 1.67 | 1.57 | 3.69 | 4.04 |
| *SD* | *1.02* | *15.06* | *.52* | *5.31* | *5.47* | *6.69* | *5.40* | *7.29* | *1.44* | *72.23* | *1.01* | *.46* | *.46* | *.46* | *.47* | *1.30* | *1.67* | *1.58* | *3.66* | *4.04* |

*Note*. (1) Life-course variability in subjective well-being, (2) Childhood general intelligence, (3) Sex, (4) Openness, (5) Conscientiousness, (6) Extraversion, (7) Agreeableness, (8) Emotional Stability, (9) Education, (10) Earnings at 33, (11) Lifetime self-rated health, (12) Current marital status at 33, (13) Current marital status at 42, (14) Current marital status at 47, (15) Current marital status at 51, (16) Lifetime mean subjective well-being, (17) Prediction inaccuracy at 33, (18) Prediction inaccuracy at 42, (19) Recall Inaccuracy, (20) Dishonesty. Correlation coefficients above the diagonal in italics are maximum-likelihood estimates; correlation coefficients below the diagonal in Roman font are based on pairwise deletion of missing values. Means and standard deviations in italics are maximum-likelihood estimates; means and standard deviations in Roman font are based on all non-missing values. * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed), unadjusted for multiple comparisons.