



# Climbing up ladders and sliding down snakes: an empirical assessment of the effect of social mobility on subjective wellbeing

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## Abstract

We examine how intergenerational mobility impacts on subjective wellbeing (SWB) drawing on data from the British Cohort Study. Our SWB measures encapsulate both life satisfaction and mental health, and we consider both relative and absolute movements in income. We find that *relative* income mobility is a significant predictor of life satisfaction and mental health, whether people move upward or downward. For *absolute* income, mobility is only a consistent predictor of SWB and mental health outcomes if the person moves downwards, and in this case the impact is far larger than *relative* mobility. For both *relative* and *income* mobility, downward movements impact SWB to a greater extent than upward movements, consistent with exhibiting loss aversion. Notably, we find that *social class* mobility does not affect SWB. We present evidence that the significant relative and absolute mobility effects we find operate partially through financial perceptions and consumption changes which can occur because of income mobility.

**Keywords** Income mobility · Social class mobility · Life satisfaction · Subjective wellbeing · Mental health

**JEL classification** D31 · D63 · I1 · I14 · J60

## 1 Introduction

Income mobility is regularly touted as a means through which individuals who were born into lower socioeconomic backgrounds can access a ‘better’ life. Mechanically, ‘better’ implies more income, and possibly even better quality of work. However, intuitively ‘better’ should also mean higher levels of subjective wellbeing (SWB). In

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this paper, we consider how social mobility impacts on SWB, with SWB being measured either as changes in an individual's self-reported life satisfaction or mental health. We consider three different measures of income mobility, which capture both absolute and relative mobility movements.

Related to our work is a large literature that looks at how relative income impacts SWB (e.g., Clark et al. 2008; Dolan et al. 2008; Bechtel et al. 2012). The main message from this literature is that SWB is adversely affected if you are surrounded by people who are richer than you. Relative income has been measured in a host of ways but usually the comparison group are people of a similar age and gender at a given point in time (Knight and Song 2006; Luttmer 2005; Card et al. 2010; Li et al. 2011; Senik 2004). That is, people who I find comparable with myself with respect to some key demographic. Additionally, the comparison group could be the income that an individual has experienced in their past. This accommodates the notion that people feel relative changes in income more intensely than absolute levels of income (Rabin 2004). Where comparisons with past income have been considered, it has been usual to consider the income that the individual themselves has earned in the recent past. There are two exceptions. First, Clark and D'Angelo (2009) look at how upward social *class* mobility affects SWB by drawing on 15 waves of the British Household Panel Survey. They find that individuals with greater mobility also have higher levels of life satisfaction. Their scope is more limited than our study as they only consider upward mobility, defined as a binary indicator. In contrast, we study downward mobility and also the extent of the adjustment, by considering percentile change alongside. Second, McBride (2001) utilises the answer to the following question to create an inter-generational measure of mobility: 'compared to your parents when they were the age you are now, do you think your own standard of living now is: much better, somewhat better, about the same, somewhat worse, or much worse?' The author finds that respondents who perceive their parents as having had a higher standard of living in comparison to their own, report lower levels of SWB. This study is also limited, however, in its cross-sectional nature and by the fact that the respondent is asked to recall their parents' standard of living<sup>1</sup>. In this work, we explore how both upward (positive) and downward (negative) income mobility impact on SWB. We draw on the British Cohort Study (BCS) to show how income mobility affects SWB, and consider both relative and absolute inter-generational income movements.

Overall, we find that upward mobility augments SWB and downward mobility deteriorates SWB, with the overall effects of downward mobility always being the greatest in magnitude. Notably, upward relative income mobility augments SWB more than upward absolute income mobility (where the latter effects are zero). In contrast, downward absolute income mobility deteriorates SWB more than downward relative income mobility. The estimates implied by downward absolute mobility movements are substantive, while all other effects are modest. To give some context, earning £100 less than your parents on a weekly basis (which is less than the movements experienced by the average person in the data we consider), gives the same deterioration to life satisfaction as being unemployed has been shown to impact

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<sup>1</sup> Asking people to recall standard of living runs the risk of both measurement error and telescoping (Rodriguez et al. 2006).

on life satisfaction (Clark et al. 2008). Crucially, our results are robust to several specifications. We also present suggestive evidence that the income mobility effects we find operate partially through financial perceptions (i.e., how a person is feeling about their financial situation) and consumption changes which occurred because of mobility.

## 2 Conceptual framework

### 2.1 Income mobility and SWB

To consider how income mobility impacts SWB, we envisage a utility function with a reference point for income determined by the individual's own past income. We assume that new cohorts begin with aspirations that are at least as high as their own parents. Specifically, we expect that individuals want to consume more or equal amounts as compared to their own parents. We also expect that the experience of mobility is worse for those who are downwardly mobile, with slower rates of adaptation. We expect that adaptation will be quicker for those that are upwardly mobile, implying little or no legacy effects on current SWB. Our hypothesis is consistent with the notion that losses in social mobility resonate more, and for longer, than gains i.e. akin to classic loss aversion. Evidence of loss aversion abounds in many other contexts (e.g., Shea 1995a; Shea 1995b; Bowman et al. 1999). Assuming that loss aversion affects mobility, it follows that the absolute impact on SWB of a loss of one dollar, from an initial reference position, is greater than the effect of a gain of one dollar (Tversky and Kahneman 1991).

In our work, we explore inter-generational upward and downward income mobility. We see four pathways that are not mutually exclusive through which income mobility can affect SWB. Given the data at our disposal, we attempt to disentangle which of these channels is the most important. These are: (i) stress (ii) prosperity concerns (iii) identity and (iv) consumption changes.

For the first pathway, we envisage individuals fully internalizing their new status and gaining a 'feeling of pride' when they are mobile and a 'feeling of 'despair' when they are dis-mobile. This internalization is a direct pathway through which mobility can impact on SWB. Our second pathway relates to a person's perception of their own financial security, conditional on actual earnings. Feelings about earnings can impact on SWB over and above the impact of the level of earnings. A long literature highlights that poorer perceptions of one's current financial situation is associated with lower SWB and that perceptions of change in financial circumstances predict well-being (Wildman and Jones 2002; Brown et al. 2005; Johnson and Krueger 2006).

For the first and second pathways, SWB is affected through increased or decreased stress levels. Johnston and Lordan (2012) document the mechanisms by which stress affects SWB. We argue that any stress effects caused in the immediate aftermath of downward income mobility can also be exacerbated further, as individuals who report low levels of SWB are also less likely to commit to the future and be optimistic. Consequently, they are less likely to pursue a lifestyle that includes regular exercise and managing a nutritious diet which have been linked directly to SWB

(Lordan and Pakrashi 2014 and Lordan and Pakrashi 2015). Alternatively, they may engage in risky health-behaviors such as excessive drinking and smoking (Macinko et al. 2003). For individuals who are upwardly mobile, there may also be an alleviation of stress as they move from a situation with less disposable income (and vice versa for the downwardly mobile), to one where they no longer need to make ends meet.

The third pathway, the identity hypothesis, stems from evidence that changing comparison groups, can affect an individual's sense of identity (Akerlof and Kranton 2010). All animals, including human ones, need to feel that they belong to a group; being mobile in income, even if mobility is upward, can result in an individual neither feeling part of their former group nor part of their new group. This process is used to explain why children from poor backgrounds who win college scholarships are not as happy as other peers from more affluent backgrounds (Aries and Seider 2005). With respect to this study, identity loss can potentially affect those that are both upwardly and downwardly mobile if the person no longer socializes with old friends and family members regularly, and misses the experience.

The fourth pathway concerns consumption changes. This suggests that individuals may not fully realise the utility (disutility) of their new income status. If true, individuals who are upwardly income mobile consume less. This may occur because these individuals do not feel secure in their newfound status and want to ensure they can smooth future consumption. Finally, having grown up in a lower income environment, they may not view themselves as needing the same level of consumption as those who have grown used to it. This suggests that individuals who are upwardly mobile are slow to adapt, as it takes time to discover and pursue the new consumption bundles available to them. Conversely, downward mobility may impact SWB if individuals still spend in accordance with their former reference group, and take on too much debt. It follows that they also worry about their financial situation (our first pathway) despite consuming more.

### 3 Data and methods

We draw on the 1970 British Cohort Study (BCS70). The BCS70 began by including more than 17,000 births between April 5th through 11th in 1970. It is estimated that these births represent more than 95% of births over these days in England, Scotland, Wales and Northern Ireland. We draw on data from: 1975, 1980, 1986, 1991, 1996, 2000, 2004 and 2008. Added to the three major childhood surveys (age 5, 10 and 16) are children born outside of the country during the week of April 5th through 11th and could be identified from school registers at later ages.

#### 3.1 Income mobility measures

This work focuses on the impact of income mobility as defined by changes in household income from ages 10 (survey taken in 1980) through to ages 30 (survey taken in 2000) and 34 (survey taken in 2004). Age 10 is chosen, as it is the earliest year that income information was gathered from the BCS families (please see Appendix A, A.1 for more detailed information on the income variable). Using

multiple years of income in adulthood helps abate concerns that income gathered in a ‘one snapshot’ fashion is not a good measure of permanent income. It is, however, worth noting that for surveys like these the correlation between current income and permanent income is very strong (0.74) (Blanden et al. 2012).

Ages 30 and 34 are chosen as they are deemed ages when a person is likely to be settling into their permanent income level. They are also the years when the most questions are asked regarding mental health and life satisfaction. Considering two different time points is important for two distinct reasons. First, for some careers (for example, an academic who is tenure tracked) a person may not have settled into a particular income by age 30. Second, a person who finds that they are doing better/worse than their parents at age 30 may have SWB gains/losses at that time but adapt as they realize their gains/losses are permanent.

We consider three measures of income mobility: two measures of relative mobility and one that captures absolute mobility. Our first relative mobility measure is defined as the intergenerational movement between income quintiles. A person is defined as upwardly mobile if they moved upward at least one quintile from their parents’ household income quintile in 1980 by age 30/34. Conversely, a person is defined as downwardly mobile if they moved downward at least one income quintile<sup>2</sup>. In both cases these variables take on a value of 1 or 0.

Our second measure of relative income mobility is based on absolute percentile change in income. A person is defined as upwardly mobile if they moved upward at least one percentile from their parents’ household income percentile in 1980 by age 30/34. For example, if a respondent’s parents were in the 30th income percentile at age 10, and the respondent reaches the 70th percentile among their own cohort at age 30, the variable takes on the value of 40. A second variable then captures downward mobility in the same way. Overall, this measure is derived by first calculating the difference between the BCS child’s income in percentiles minus their parent’s income in percentiles. Subsequently we create two variables to capture upward mobility and downward mobility. Upward mobility is defined as equal to this difference if it is positive and zero otherwise, and vice versa for downward mobility. Thus, we capture the intensity of relative income mobility movements<sup>3</sup>.

Our third income mobility measure is defined as the difference between adult and childhood income. Because the income bands reported in 1980 relate to gross income, it is necessary to calculate an approximation of what the take home pay would have been. To do this, we convert the mid-points of the 1980 income bands into 2004 GBP. Next, we calculate what the weekly take home pay would have been

<sup>2</sup> We rely on the Family Expenditure Survey to define our income quintiles given that attrition in 1980 is likely to be non-random and cohort studies tend to underestimate income for the income distribution (Blanden et al. 2012). This is in comparison to the Family Expenditure Surveys (FES) of the same year, which contains more detailed information. For 1980, the relevant income quintiles were drawn from the same year’s data sets based on the variable representing gross normal household income. For 2000 and 2004, the relevant income quintiles were defined based on the disposable income deciles reported in the Office of National Statistics reports of the same surveys. Along with circumventing an attrition problem, which may induce measurement error in the BCS cohort’s income distribution, this also overcomes the limitations of income being reported in gross form in childhood surveys but as net in recent years. Further details of how the quintiles were derived is in Appendix A, A.2.

<sup>3</sup> Further details are provided in Appendix A.3.

given the average tax rules of the 2004/2005 tax year. For the 2000 differences we use the same values and therefore convert weekly income at age 30 into 2004 values. Further details are provided in Appendix A.4. For values that are greater than zero, we create a variable defined ‘upwardly’ mobile, that is zero otherwise. For values that are less than zero, we create a variable defined ‘downwardly’ mobile that is zero otherwise.

Descriptive statistics for all variables used in this study are provided in Table 1.

**Table 1** Descriptive statistics of core variables

Variables	Mean	Standard dev
Age 30 outcomes		
Life satisfaction	7.290	1.848
Malaise	3.534	3.491
GHQ	10.671	4.520
Age 30 relative mobility (quintile based)		
Upward	0.181	N/A
Downward	0.112	N/A
Age 30 relative mobility (percentile based)		
Upward	0.181	N/A
Downward	0.112	N/A
Age 30 relative mobility (percentile based)		
Upward	27.56	11.01
Downward	19.56	15.48
Age 30 absolute mobility		
Upward	111.19	31.07
Downward	71.37	38.58
Age 34 outcomes		
Life satisfaction	7.404	1.798
Malaise	1.401	1.791
Kessler	17.608	2.741
Age 34 relative mobility (quintile based)		
Upward	0.160	N/A
Downward	0.123	N/A
Age 34 relative mobility (percentile based)		
Upward	22.99	12.97
Downward	20.50	15.04
Age 34 absolute mobility		
Upward	133.13	27.63
Downward	115.42	29.47
Childhood control variables		
Birth weight	324	(52.76)
Female	0.483	(0.500)

**Table 1** continued

Variables	Mean	Standard dev
Mother has A level+	0.260	(0.430)
Mother has O level	0.181	(0.382)
Mother has trade qualification	0.301	(0.457)
Mother has other qualification	0.009	(0.096)
Mother has no qualification	Reference group	
Mothers age	27.16	(5.67)
Mother is employed dummy	0.48	(0.500)
Father has A level	0.25	(0.305)
Father has O level	0.175	(0.371)
Father has trade qualification	0.431	(0.282)
Father has other qualification	0.018	(0.133)
Mother has no qualification	Reference group	
Fathers age	28.86	(6.21)
Father is employed dummy	0.896	(0.304)
Child has no father figure	0.05	(0.21)
Household size	3.08	(1.41)
Tenure (dummy = 1 if owns house)	0.6	(0.44)
Number of younger siblings	0.837	(0.933)
Number of older siblings	0.592	(0.605)

The data is the British Cohort Study. GHQ is the 12-item version of the General Health Questionnaire (GHQ). The Kessler scale is the psychological distress scale

### 3.2 SWB outcomes

Our primary analysis considers how inter-generational income mobility that occurred between 1980 and 2000/2004 affects the SWB of the BCS respondents. The first proxy of SWB is based on a life satisfaction question that takes a value from 0 to 10 where 10 is the highest level of satisfaction and is available at ages 30 and 34.

At age 30 we also proxy SWB with a measure of mental health, specifically the Rutter Malaise Inventory (Rutter et al. 1970), which is a set of 24 questions that combine to measure levels of psychological distress and depression. At age 30, its scores range from 0 to 24, with each question scoring a value of 1. For age 34, only nine of the questions usually asked in the Rutter Malaise Inventory were included in the survey and we therefore rely on a sub-index, which takes on values from 0 through 9.

We also measure mental health using the 12-item version of the General Health Questionnaire (GHQ) at age 30. The GHQ is a commonly used self-reported measure of mental health and consists of questions regarding the respondent's emotional and behavioral health over the past few weeks. Each response to the GHQ garners one point, yielding a score that can potentially range from 0 to 12. The GHQ is not available at age 34 but this wave of the survey did include four questions usually included in the Kessler scale, an alternative proxy for mental health.

The Kessler scale in the BCS data has 6 items, whereas the full scale is a 10-item questionnaire (Kessler et al. 2002). We follow the same method here used to aggregate the 10-item index when creating the sub-index we rely on this study.

Descriptive statistics for all variables used in this study are provided in Table 1, and further details of the SWB outcome variables are provided in appendix A.4.

### 3.3 Econometric approach

This study relies on the following model to estimate the impact of income mobility on SWB:

$$\text{Outcome}_{it} = \beta_1 UP_{t-1980} + \alpha_1 DOWN_{t-1980} + \gamma'x_{1980} + \chi'y_{adult} + \varepsilon_i. \quad (1)$$

In Eq. (1)  $i$  indexes the BCS child and  $t$  indicates either study wave at 30 years or 34 years.  $UP_{t-1980}$  then denotes upward social mobility and  $DOWN_{t-1980}$  denotes downward social mobility.  $x$  is then a vector of childhood variables<sup>4</sup> and  $y$  denotes a vector of adult variables that can affect SWB which are taken at age 30 or age 34 depending on the timing of the outcome of interest<sup>5</sup>. From Eq. (1) we can identify if income mobility is a predictor of SWB, holding constant adult and childhood income as well as the usual demographics. We cannot claim a causal effect given that mobility may be correlated with many other factors that are also correlated with SWB that are not measured in the BCS. Later, we make substantial efforts to explore what these factors may be to identify further plausible pathways through which any mobility effects found may be operating.

## 4 Results

We document the estimates for the age 30 analysis in Table 2. We note that higher values of life satisfaction denote higher levels of SWB. In contrast, lower values of malaise and GHQ imply higher levels of SWB (i.e. better mental health). A few stylized facts emerge from considering Table 2. First, the coefficients are always of the expected sign and are mostly significant. Overall, they imply that upward mobility augments SWB and downward mobility deteriorates SWB.

<sup>4</sup> These are: household weekly income, birth weight, gender, maternal education (indicators as to whether she has a degree, a vocational qualification, 'A' levels, 'O' levels, a trade qualification or 'other' qualification), mother's age, maternal employment, fraternal education (consistent with the definition of maternal education), father's age, father's employment, household size, household size squared, tenure (whether owns own house), number of younger siblings, number of older siblings, region of birth, and a dummy indicating whether the child had no father figure. When data at age 10 are missing for mothers or father's education, age, income or employment because they are living in a single parent household the variable is coded as 0 (imputing at the mean does not change the estimates). We note that this means there is still substantial attrition, given that at baseline there were 17,000 births and in Tables 2 and 3 we have circa 5000 children in our various analyses. We have experimented with imputing the control variables (raising the sample to almost 8000 observations). For all analyses the estimates increase slightly but the overall conclusions remain.

<sup>5</sup> These are weekly household income, social class (a set of fixed effects that denote one of the six registrar general social classes), marital status (disaggregated into fixed effects representing married, cohabiting, single and separated/divorced/widowed), whether or not the BCS child has a degree, household size and household size squared.



**Table 2** Impact of relative income mobility-quintile based on outcomes at age 30

Variables	Life satisfaction (+)	Malaise (-)	GHQ (-)
Quintile based relative mobility			
Upward mobility	0.161***	-0.217**	-0.311**
Downward mobility	-0.319***	0.256**	0.300*
Percentile based relative mobility			
Upward mobility	0.006***	-0.005**	-0.007*
Downward mobility	-0.010***	0.008***	0.014***
Absolute income mobility			
Upward mobility	0.005	-0.019*	-0.026*
Downward mobility	-0.832***	0.680***	1.083***
Sample size	5381	5383	5380

Quintile based income mobility = 1 if a person moved up or down one income quintile. Percentile income mobility represents the difference in percentile that an individual moved as compared to their parent. The closest comparison to quintile based relative mobility is to multiply the coefficient of percentile-based mobility by 20. Absolute income mobility represents the difference between current and past parental income, divided by 100. It therefore represents the inter generation weekly income gap in 100's of British pounds. The regressions we consider also include controls for 11 possible regions of residence at age 10, along with the following childhood variables measured at age 10: household weekly income, birth weight, gender, maternal education (indicators as to whether she has a degree, a vocational qualification, 'A' levels, 'O' levels, a trade qualification or 'other' qualification), mother's age, maternal employment, fraternal education (consistent with the definition of maternal education), father's age, father's employment, household size, household size squared, tenure (lives in a rural area, lives in an urban area, lives in a council estate, lives in a suburb, lives in 'other' area), number of younger siblings, number of older siblings, region of birth, and a dummy indicating whether the child had no father figure. Additionally, we control for the following adult variables measured at age 30: weekly household income at age 30, social class (a set of fixed effects that denote one of the six registrar general social classes), marital status (disaggregated into fixed effects representing married, cohabiting, single and separated/divorced/widowed), whether or not the BCS child has a degree, household size and household size squared. When data at age 10 are missing for mother's or father's education, age, income or employment because they are living in a single parent household the variable is coded as 0 (imputing at the mean does not change the estimates). Note that birth weight was collected at birth. The estimated effect is the OLS regression coefficient. \*, \*\* and \*\*\* denote significance at 0.10, 0.05 and 0.01 levels

Second, the effects of downward mobility are always greater than those for upward mobility. This is consistent with the loss aversion hypothesis described earlier in the study. That is, downward mobility hurts more i.e. losses hurt more than gains. For example, in the case of absolute income upward mobility, the estimate is centered around zero (0.005) and not significant. This compares to the estimate of

–0.832 for downward income mobility, implying that if an individual earned 100 GBP less than their parents per week (an amount that is less than the average movement observed in the data), their life satisfaction would decrease by 0.832 units. This implies that a 225 GBP increase in weekly income of their parents leads to a deterioration in SWB of about 1 standard deviation (standard deviation = 1.848, and a 225 GBP weekly increase is the approximately the maximum decrease experienced, see Table 1). This is a very substantive decline if taken in the context of the life satisfaction literature where few things have been shown to influence this specific outcome with no adaptation. For example, much is made of the effects of unemployment on SWB, an exception to this rule, where one year after becoming unemployed the effects of being unemployed are still 0.26 of a standard deviation (see Clark et al. 2008). The effects of downward absolute income mobility for malaise and GHQ are also relatively substantive. Specifically, a 100 GBP decrease in weekly income compared to the cohort child's own parent worsens their malaise by about 1/6 of a standard deviation (standard deviation = 3.491, see Table 1). For GHQ this dis-improvement is about 0.25 of a standard deviation (standard deviation = 4.5, see Table 1). Notably, the implied effects of absolute income upward mobility on malaise and GHQ are significant, but very modest. For percentile based relative income mobility, the estimates are also much smaller for upward mobility as compared to downward mobility. In addition, the effects are much less substantive as compared to absolute income mobility. Specifically, a person would need to move about 80 percentiles on the income distribution to get the same deterioration to life satisfaction as would be suggested by receiving 100 GBP less than their parents in weekly income. The percentile movements implied for GHQ and malaise are equally large, and unlikely. In contrast the effects of relative income upward mobility, as measured by percentile change, are always significant and more substantive than those implied by absolute income mobility, albeit they are still modest. Finally, for quintile based relative income mobility, the estimates for life satisfaction imply that downward mobility hurts twice as much as the gains experienced for upward mobility (–3.19 vs. 0.161). The estimates for both malaise and GHQ are also significantly larger for downward mobility.

Third, specific to upward mobility, relative movements in income matter more as compared to absolute movements in income. However, the effects of downward absolute income mobility on life satisfaction, malaise and GHQ has a more substantive imprint on SWB as compared to this relative measure. In other words, if you are moving upward socially to get the greatest SWB gains you should be moving on your own within your comparison group (this conclusion is drawn given the coefficients for the relative mobility regressions are larger than those for the absolute mobility regressions when we consider upward mobility). However, absolute income losses relative to your parents are felt heavier than relative losses in terms of SWB. To get to the equivalent 'pain' in terms of wellbeing deterioration from a relative downward movement, as compared to a 100 GBP weekly decrease in absolute income compared to the cohort child's parent, they would have to move a large number of income quintiles. For example, the implied movement would be three income quintiles in the case of GHQ.

Table 3 is in the same format as Table 2 and documents the estimates drawing on the BCS data at age 34. Comparing across Table 2 and Table 3, the overall

**Table 3** Impact of relative income mobility (quintile based) on outcomes at age 34

Variables	Life satisfaction (+)	Malaise (-)	Kessler (+)
Quintile based relative mobility			
Upward mobility	0.127**	-0.116*	0.167*
Downward mobility	-0.167***	0.095	-0.195**
Percentile based relative mobility			
Upward mobility	0.006**	-0.002	0.005**
Downward mobility	-0.009***	0.005***	0.007***
Absolute income mobility			
Upward mobility	0.002	0.020	0.036
Downward mobility	-0.452***	0.411***	-0.612***
Sample size	4845	4844	4845

Quintile based income mobility = 1 if a person moved up or down one income quintile. Percentile income mobility represents the difference in percentile that an individual moved as compared to their parent. The closest comparison to quintile based relative mobility is to multiply the coefficient of percentile-based mobility by 20. Absolute income mobility represents the difference between current and past parental income, divided by 100. It therefore represents the inter generation weekly income gap in 100's of British pounds. The regressions we consider also include controls for 11 possible regions of residence at age 10, along with the following childhood variables measured at age 10: household weekly income, birth weight, gender, maternal education (indicators as to whether she has a degree, a vocational qualification, 'A' levels, 'O' levels, a trade qualification or 'other' qualification), mother's age, maternal employment, fraternal education (consistent with the definition of maternal education), father's age, father's employment, household size, household size squared, tenure (lives in a rural area, lives in an urban area, lives in a council estate, lives in a suburb, lives in 'other' area), number of younger siblings, number of older siblings, region of birth, and a dummy indicating whether the child had no father figure. Additionally, we control for the following adult variables measured at age 34: weekly household income at age 34, social class (a set of fixed effects that denote one of the six registrar general social classes), marital status (disaggregated into fixed effects representing married, cohabiting, single and separated/divorced/widowed), whether or not the BCS child has a degree, household size and household size squared. When data at age 10 are missing for mothers or father's education, age, income or employment because they are living in a single parent household the variable is coded as 0 (imputing at the mean does not change the estimates). Note that birth weight was collected at birth. The estimated effect is the OLS regression coefficient. \*, \*\* and \*\*\* denote significance at 0.10, 0.05 and 0.01 levels

conclusions drawn thus far remain true. First, all of the estimates have the expected sign, implying that downward mobility hurts, and upward mobility brings gains to SWB when income movements are relative (we note that all of the estimates for upward absolute income mobility are centered around zero and not significant). The

estimates in Table 3 are also of a decent order of magnitude larger for downward losses as compared to upward gains for SWB. These differences are very striking for absolute income mobility (for example  $-0.452$  vs.  $0.002$  for life satisfaction), but are still roughly 1.5 times the size when we consider the relative mobility measures. Last, specific to upward mobility, relative income movements matter more as compared to absolute movements, however the estimates suggest only a modest augmentation of SWB. In contrast, the effects of downward absolute income mobility on life satisfaction, malaise and GHQ is a more substantive imprint compared to the relative measures, and the magnitude is also substantive.

Recall the suggestion that any effects of income mobility on SWB found could potentially operate through four non-mutually exclusive channels. These are: (i) stress (ii) prosperity concerns (iii) identity and (iv) consumption changes. Table 4 presents some results that allow us to explore these potential pathways further. First, we explore the identity hypothesis drawing on data from the 2000 survey (age 30). Specifically, the BCS child is asked how often they see their mother with the following response options: (i) more than once a week (ii) more than once a month and (iii) less than once a month (iv) never (v) lives with mother. In Table 4, the results under the heading ‘maternal contact regressions’ detail results from regressions that add these five fixed effects to the model described in Eq. 1. The intuition being that an individual’s ‘old’ identity will be stronger if an income mobile individual has kept in closer contact with their own mother, and weaker if they never see them. We note that there will be measurement error in this variable as it also includes individuals whose mother has passed away, to retain the same samples as previous regressions. However, when we consider a robustness that excludes individuals whose mother has passed away there are no significant changes to the coefficients. Two things are worth noting from Table 4. First, maternal contact does not seem to be an important predictor of SWB outcomes. The exception is for the group that never see their mother, where the estimate is substantive but only significant for malaise. Second, the estimates for upward and downward mobility are never attenuated when we include these sets of variables, although in a few cases they are augmented. This implies that our identity proxy does not explain the underlying relationship between income mobility and SWB that we documented in Table 3.

The section of Table 4 labelled ‘prosperity concerns’ explores whether perceptions about financial security can explain the link between SWB and income mobility documented in Tables 2 and 3. Specifically, we add to Eq. 1 a set of fixed effects that represent a measure of perceived financial prosperity gathered from the BCS respondents at age 30, which takes on values one through five, representing the response to the question: ‘how well are you managing financially these days?’. The options for the BCS respondent are: (1) living comfortably (2) doing alright (3) just about getting by (4) finding it quite difficult or (5) finding it very difficult. From Table 4, we note that prosperity concerns are a viable pathway through which income mobility is operating. In particular, all of the income mobility estimates are attenuated, with most centered around zero and not significant. We note that the estimates for downward mobility across all three income mobility measures remain substantive, although they are attenuated, implying that financial security is a partial pathway through which the estimates documented in Tables 2 and 3 were operating.

**Table 4** Exploring pathways for the mobility effects

Variables	Life satisfaction	Malaise	GHQ
Maternal contact regressions—age 30 data			
Quintile mobility			
Upward mobility	0.166***	−0.206*	−0.275*
Downward mobility	−0.292***	0.295***	0.302*
Maternal contact			
Once a week	0.053	−0.131	0.092
More than once a month	0.038	−0.031	0.197
Less often than monthly	0.026	−0.040	0.252
Never	−0.425	1.085*	0.953
Lives with mother	Reference group	Reference group	Reference group
Percentile mobility			
Upward mobility	0.006***	−0.006**	−0.006
Downward mobility	−0.009***	0.009***	0.014***
Absolute mobility			
Upward mobility	0.005	−0.015	−0.017
Downward mobility	−0.798***	0.769***	1.069***
<i>N</i>	5381	5383	5380
Prosperity regressions—age 30 data			
Quintile mobility			
Upward mobility	0.046	−0.097	−0.038
Downward mobility	−0.193***	0.118	0.033
Prosperity			
Living comfortably	1.717***	−3.449***	−6.273***
Doing alright	1.395***	−3.281***	−6.015***
Just about getting by	0.876***	−2.457***	−4.725***
Finding it quite difficult	0.343***	−1.362***	−2.157**
Finding it very difficult	Reference group	Reference group	Reference group
Percentile mobility			
Upward mobility	0.002	−0.001	0.002
Downward mobility	−0.006***	0.003	0.006
Absolute mobility			
Upward mobility	−0.000	−0.012	−0.014
Downward mobility	−0.503***	0.282	0.315
<i>N</i>	5381	5383	5380
Savings regressions			
Quintile mobility			
Upward mobility	.081	−0.102	0.135
Downward mobility	−0.113*	0.065	−0.159*
Savings			
Saves monthly (yes = 1 No = 0)	0.367***	−0.258***	0.385***
Total monthly savings	0.182***	−0.000	0.094

**Table 4** continued

Variables	Life satisfaction	Malaise	GHQ
Percentile mobility			
Upward mobility	0.004***	-0.002	0.004*
Downward mobility	-0.007***	0.004*	-0.006***
Absolute mobility			
Upward mobility	-0.005	0.023	-0.042*
Downward mobility	-0.332***	0.347***	-0.519***
<i>N</i>	4845	4844	4845

See notes to Table 2 for age 30 regressions and Table 3 for age 34

Finally, we explore consumption changes by drawing on the intuition that if individuals are consuming less, they will necessarily save more. Using information on savings habits gathered at age 34, we add two variables to Eq. 1. These are (i) an indicator (yes/no) for if the BCS respondent is saving monthly; and (ii) how much the child saves monthly in £'s (equal to zero if the binary indicator (i) represents no savings). The results from these regressions are documented in Table 4 under the heading 'savings' regressions. First, we note that savers overall have higher levels of wellbeing. Second, adding the savings variables to the regressions does attenuate most of our estimates, although not as substantively as the prosperity channel.

Our work has documented a persistent relationship between income mobility- both relative and absolute- and a variety of SWB outcomes. We have presented evidence that these effects are likely caused by financial perceptions and consumptions changes. We note that our proxy for identity changes is less than ideal, and this may explain why we do not find any evidence in favor of this pathway. Given the impact of income mobility on SWB, particularly downward absolute mobility, the last question is whether or not this is a causal relationship. It is feasible that some of the effects we find are determined by characteristics of the individual that makes them more likely to be mobile (for example being more or less gritty). Additionally, individual personality factors may be correlated with the reporting of a certain level of SWB and also the likelihood of mobility. To consider this possibility further we include some personality proxies in our life satisfaction regressions. We focus on life satisfaction because of data availability for our lagged robustness test (see below). Specifically, we include an index of emotional and behavioral problems at age 10 and age 16. These indexes are labeled as non-cognitive skills (Heckman 2008, Lek-fuangfu and Lordan 2018) and are based on the Rutter behavioral problems index. Further, for two of the outcomes we consider it is possible to add a lagged dependent variable to Eq. 1. These are only for life satisfaction which we observe with a lag of four years (that is, at age 26 for the age 30 outcomes and at age 30 for the age 34 outcomes). Including a lagged dependent variable should control for any negative 'feelings' associated with being mobile as its information was gathered at a time when the BCS child would have had already some knowledge of their income attainment in comparison to their parents. Consequentially, any adaption would already have begun. The results are documented in Table 5.

**Table 5** Controlling for childhood non-cognitive skills and lagged models

Variables	Life satisfaction age 30	Life satisfaction age 34
Adding non-cognitive skills at age 10		
Quintile mobility		
Upward mobility	0.206***	0.128**
Downward mobility	-0.395***	-0.156***
Behaviour		
Maternal reported	-0.006***	-0.006***
Percentile mobility		
Upward mobility	0.006***	0.004***
Downward mobility	-0.009***	-0.007***
Absolute mobility		
Upward mobility	0.001	0.006
Downward mobility	-0.825***	-0.314***
Adding lagged life satisfaction		
Relative mobility		
Upward mobility	0.335	0.009
Downward mobility	-0.693***	-0.362***
Lagged dependant variable		
4 years prior	0.335***	0.362***
Percentile mobility		
Upward mobility	0.006***	0.004***
Downward mobility	-0.006***	-0.006***
Absolute mobility		
Upward mobility	0.010	0.002
Downward mobility	-0.659***	-0.267**

These regressions also include the controls detailed in Table 2 and notes to Table 2 are relevant

Turning to Table 5, when we control for non-cognitive skills in panel 1, the overall conclusions of Tables 2 and 3 are robust, with the estimates not changing substantively. Relative income mobility predicts life satisfaction modestly and significantly, whereas for absolute mobility only downward mobility matters and the implied effects are substantive. Considering the second panel of Table 5, when we add lagged life satisfaction most of the estimates are attenuated, however they remain

significant for downward mobility across all three measures of income mobility. That is, regardless of how we measure downward mobility (relative or absolute) it remains a significant negative predictor of life satisfaction at ages 30 and 34 despite lagged life satisfaction being included as a control variable.

This work has considered income mobility, however the data at our disposal does also have a measure of social class. Specifically, the Registrar General's definition of social class which divides of individuals into six distinct social classes. Utilizing this information, we can re-estimate Eq. 1 and consider the effects of social class mobility. These estimates are documented in Table 6. We note caution. Unlike our income mobility estimates, which control for both childhood income and adult income, we cannot control for childhood and adult social class. This means our estimates are likely to be upward biased. This problem arises owing to multicollinearity. Overall, Table 6 suggests that social class mobility does not affect any of our outcomes significantly, allowing us to conclude that income mobility matters more than social class mobility for predicting SWB.

**Table 6** Social class mobility

Variables	Life satisfaction age 30	Malaise age 30	Health age 30	GHQ age 30
<b>Mobility</b>				
Upward mobility	-0.085	0.069	0.058**	0.279
Downward mobility	-0.098	0.123	0.048*	-0.068
<b>Social class</b>				
Class 1	Reference	Reference	Reference	Reference
Class2	-0.166*	0.362**	0.065	0.029
Class 3.1	-0.384***	0.285	0.077*	0.243
Class 3.2	-0.397***	0.415**	0.140***	-0.300
Class 4	-0.495***	0.521**	0.180***	-0.097
Class 5	-0.453***	0.528	0.042	-0.229
	Life Satisfaction Age 34	Sub malaise age 34	Health Age 34	Sub Kessler Age 34
Upward mobility	-0.018	0.035	0.007	-0.066
Downward mobility	-0.073	0.049	0.002	-0.098
<b>Social class</b>				
Class 1	Reference	Reference	Reference	Reference
Class2	-0.067	0.056	0.035	-0.049
Class 3.1	-0.332***	0.147	0.068	-0.200
Class 3.2	-0.184	0.035	0.052	-0.131
Class 4	-0.326**	0.132	0.157**	-0.411*
Class 5	-0.341*	0.012	0.039	-0.162

These regressions also include the controls detailed in Tables 2 and 3. The estimated effect is the OLS regression coefficient. \*, \*\* and \*\*\* denote significance at 0.10, 0.05 and 0.01 levels. \*Birth weight was collected at birth



## 5 Discussion

In this work, we examine how intergenerational mobility affects SWB drawing on the British Cohort Study. We consider several outcomes that capture life satisfaction and mental health. We define mobility as income movements inter-generationally both relatively and absolutely. We define relative mobility based on changes across income quintiles and percentiles. The advantage of the former is that the quintiles are derived from external data that arguably better represent the income distribution in the UK at that time, whereas the latter allows for greater numbers of individuals to be ‘winners’ and ‘losers’ (i.e. there is more variation and we can model intensity of movements). Overall, we find that upward mobility augments SWB and downward mobility deteriorates SWB, with the effects of downward mobility being greater. This is consistent with the theory of loss aversion, essentially, downward mobility hurts more. Interestingly, for upward mobility, relative movements in income matter significantly more as compared to absolute movements, but the estimates imply only modest effects overall. The effects of downward absolute income mobility on SWB has a much more substantive imprint as compared to relative movements. In other words, if you are moving upward socially, to get SWB gains you should be moving a large distance in relative income as compared to your family. In contrast, absolute losses are felt more heavily than relative losses when you are moving down. To give some context, earning £100 less than your parents on a weekly basis gives the same deterioration to life satisfaction as being unemployed has been shown to effect life satisfaction elsewhere (see Clark et al. 2008).

We proposed four pathways through which income mobility effects may operate: (i) stress/alleviation of stress; (ii) prosperity concerns; (iii) changes in sense of identity and (iv) realised or unrealised consumption changes. We do not have data to explore whether (i) is a viable pathway. We have however presented highly suggestive evidence that the income mobility effects identified by our models are partially caused by financial perceptions and consumption changes. The effects found for consumption changes echo the importance of research considering consumption data rather than income when exploring the effects of windfalls on SWB. We note that our proxy for identity changes is a very crude measure and ideally, we would have information on changes to social networks. This may explain why we do not find any evidence in favor of this pathway, and considering better quality identity proxies is an area for future research.

Of course, individuals are not randomly assigned to a mobility status. We have tested the sensitivity of our results to alternate specifications and the conclusions we draw remain robust. Unambiguous proof of a causal effect of social mobility requires data that does not exist. We also consider how social mobility measured using the Registrar Generals framework affects SWB. We do not find any significant associations between social class mobility and SWB. This is in contrast with the results found by Clark and D’Angelo (2009); however, we do note that they identify effects of upward class mobility from a comparison with all others. In this case, ‘others’ includes those who are downwardly mobile. Overall, we conclude that income mobility matters much more than social class mobility for SWB.

A natural question arising from our work is *how* income mobility should be measured to best capture how a person decides if they are doing better or worse than

their parents. The answer is that we do not know. We do however, believe that children compare themselves to their parents. Additionally, the significance of the results we present should convince our audience that children make these comparisons based on income and some notion of changes in standard of living.

We are more circumspect in saying anything about the policy recommendations of this research because it raises many normative issues about how to appropriately weigh the many factors that go into the conceptualisation and derivation of the social welfare function. Firstly, it should be noted that income at ages 30 and 34 is also a significant independent predictor of SWB. That is, the mobility estimates we document are already conditional on both personal and childhood income. Therefore, to the extent that you would like the world to remain equitable with respect to *who* gets this SWB income effect, there is a separate argument to promoting mobility so that different individuals get to experience SWB effects owed to enjoying higher levels of personal income. Last, much of the deterioration of SWB can be explained by prosperity concerns and a lack of saving for the downwardly mobile that are larger than others experiencing the same level of income. This suggests a role for policy in helping people to stop living beyond their means.

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### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

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## 6 Appendix A

### A.1 Income Measures

#### A.1.1. Gross Income Bands 1980:

The BCS child's parents in 1980 were asked the following question: 'Please show the following income ranges and ask for the range in which the family's total gross weekly income falls (before deductions). An estimate will be acceptable.'

Include all earned and unearned income of both mother and father before deductions for tax, national insurance etc.

Exclude any income of other household members and child benefit

Total gross weekly income of parents:

Under £35 per week

£35–£49 per week

£50–£99 per week

£100–£149 per week

£150–£199 per week

£200–£249 per week

£250 or more per week

#### A.1.2. Income at ages 30 and 34

At ages 30 and 34 the BCS child was asked to state in £s both their own and their partners usual take home pay. That is, they were asked for the monetary amount that they take home after 'all deductions for tax, National Insurance, union dues, pension and so on, but including overtime, bonuses, commission and tips.'

We combine these to get a measure of household income. Specifically, if both are employed we take the simple sum of these incomes. For those households in which only one person works, household income is assigned equal to the value of his/her wages alone.

### A.2 Income Mobility Based on Inter-Generational Mobility in Income Quintiles

Our work defines income mobility as the intergenerational movement between income quintiles. For this measure a person is defined as mobile if they move upward one quintile inter-generationally. Conversely, a person is defined as downward mobile if they move down one quintile inter-generationally. Therefore, if the BCS child's parent was in income quintile 5 but they are in income quintile 1 they are defined as upwardly mobile. So, we need to relate the incomes reported in the BCS in 1980, 2000 and 2004 to a relevant income quintile.

We therefore rely on the Family Expenditure Survey to define our income quintiles for 1980. In this case the relevant income quintiles were drawn from the same year data sets based on the variable representing gross normal household income. Clearly, the reported bands do not allow us to exactly match these quintiles. However, regardless of whether we define the quintile above or below the reported matched bands, the results are robust. In this work the reported results pertain to the following quintiles: >£55, >£110, >£160 and >£225 and we cut off the bands below each quintile. That is, these quintiles collapse into >£50, >£100, >£150 and >£200.

For 2000 we also rely on the Family Expenditure Survey and the quintiles used are: > £148, >£281 >£464 and £719. Because the income data in 2000 is reported as a continuous variable we can use these quintiles 'as is'. For the 2004 the Expenditure and Food Survey replaced the Food Expenditure Survey, albeit for our purposes

similar data was collected. For this year the relevant quintiles are defined as: > £205, >£375, >£579 and >£885.

#### A.3 Relative Mobility Based on Percentile Differences in Income

While our relative mobility measure based on quintiles has the advantage of not being affected by attrition in the BCS, it also has a disadvantage of throwing away information. We therefore consider a third measure that is defined by the BCS data but retains more information. That is, we calculate the difference between the percentile income of the BCS child in adulthood (age 30 and 34) and that of their parents (age 10). Upward mobility is then defined as all positive values of this result, with negative values recoded to zero. Conversely, downward mobility is then defined as all negative values of this result, with negative values recoded to zero. This percentile measure of relative has the limitations of being based on a sample that may be biased by attrition; however, it has the advantage of retaining more information than the quintile measure of relative mobility (i.e., this variable denotes absolute percentile movements as compared to the quintile measure which is a binary variable that is either 1 or 0).

#### A.4 Absolute Mobility Based on Monetary Differences in Income

In order to create the absolute mobility measure we first transform weekly income from 1980 and 2000 into 2004 prices. Next, we use 2004 tax rules to form an estimate of what net take home pay would have been in 1980, based on the weekly gross earning bands that were collected. Specifically, this translates to

Under £35 per week in 1980 = £56.53 in 2004

£35–£49 per week in 1980 = £127.34 in 2004

£50–£99 per week in 1980 = £199.20 in 2004

£100–£149 per week = £403.81 in 2004

£150–£199 per week = £414.62 in 2004

£200–£249 per week = £530.78 in 2004

£250 or more per week = £626.07 in 2004

We define mobility as weekly net income from adulthood (age 30 or 34 in 2004 prices) minus weekly net income from childhood (age 10 in 2004 prices). As in the percentile measure, upward mobility is defined as the positive values of this result, with negative values recoded to zero. Similarly, downward mobility is defined as negative values of this result, with negative values recoded to zero.

#### A.4 Further Details of Subjective Wellbeing (SWB) Outcome Variables

The life satisfaction outcome variable is based on the response to the following question: ‘Here is a scale from 0–10 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 about the way you life has turned out so far’.

At age 30 we also proxy SWB with a measure of mental health, specifically the Rutter Malaise Inventory (Rutter et al. 1970), which is a set of 24 questions that combine to measure levels of psychological distress and depression. At age 30, its scores range from 0 to 24, with each question scoring a value of 1. The index is derived through the number of yes scores to having backaches, feeling tired, feeling miserable and depressed, having headaches, worrying, having difficulty in falling asleep or staying asleep, waking unnecessarily early in the morning, worrying about health, getting into a violent rage, getting annoyed by people, having twitches,

becoming scared for no reason, being scared to be alone, being easily upset, being frightened of going out alone, being jittery, suffering from indigestion, suffering from upset stomach, having poor appetite, being worn out by little things, experiencing racing heart, having bad pains in your eyes, being troubled by rheumatism, and having had a nervous breakdown.

For age 34, only nine of the questions usually asked in the Rutter Malaise Inventory were included in the survey and we therefore rely on a sub-index, which takes on values from 0 through 9. We derive this sub-malaise index by aggregating the number of yes responses to: feeling tired, feeling miserable and depressed, worrying, getting into a violent rage, becoming scared for no reason, being scared to be alone, being easily upset, being jittery, suffering from indigestion, suffering from upset stomach, having poor appetite, being worn out by little things, experiencing racing heart.

We also measure mental health using the 12-item version of the General Health Questionnaire (GHQ) at age 30. The GHQ is a commonly used self-reported measure of mental health and consists of questions regarding the respondent's emotional and behavioral health over the past few weeks. Each response to the GHQ garners one point, yielding a score that can potentially range from 0 to 12. The 12 items in the GHQ are: ability to concentrate, sleep loss due to worry, perception of role, capability in decision making, whether constantly under strain, problems in overcoming difficulties, enjoyment of day-to-day activities, ability to face problems, whether unhappy or depressed, loss of confidence, self-worth, and general happiness. For each of the 12 items, the respondent indicates on a four-point scale the extent to which they have been experiencing a particular symptom. For example, the respondent is asked 'have you recently felt constantly under strain', to which they can respond: not at all (a score of 0), no more than usual (1), rather more than usual (2), much more than usual (3).

The GHQ is not available at age 34 but this wave of the survey did include four questions usually included in the Kessler scale, an alternative proxy for mental health. The Kessler scale in the BCS data has 6 items, whereas the full scale is a 10-item questionnaire (Kessler et al. 2002). We follow the same method here used to aggregate the 10-item index when creating the sub-index we rely on this study. The specific questions asked are during the last 30 days, about how often did you feel (i) so depressed that nothing could cheer you up? (ii) hopeless? (iii) restless or fidgety? (iv) that everything was an effort? The possible responses are: all of the time (a score of 1), most of the time (2), some of the time (3), a little of the time (4) and none of the time (5). This results in an index that has a range between 4 and 20, with 4 being the best outcome with respect to mental health.

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