

Life Satisfaction and Grandparenthood: Evidence from a Nationwide Survey in the UK

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Abstract

The negative association between parenthood and life satisfaction is well-established in the well-being literature. Yet little is known about the relationship between life satisfaction and that of grandparenthood. Whilst social scientists agree that there is generally a demand for grandchildren, it remains an empirical question of whether or not this would be reflected in grandparents' life satisfaction responses. This article documents evidence that, conditioning on being a parent, grandparents tend to be significantly more satisfied with their life compared to non-grandparents. One explanation for this is that becoming a grandparent does not put a significant strain on individual's financial situation as much as becoming a parent.

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1. Introduction

This paper asks a simple albeit rarely tested question: Are grandparents more satisfied with their lives compared with non-grandparents? Using a new large-scale data set from the U.K., I present econometric evidence that, among respondents with children, people who are grandparents are *ceteris paribus* significantly more satisfied with their lives than those who are without grandchildren.

More specifically, I document evidence that

- (1) Having an additional grandchild is statistically significantly associated, on average, with a small increase (approximately 0.3-percentage point) in the respondent reporting to be “very satisfied” with life overall.
- (2) Given that the average number of grandchildren is approximately 4 with a standard deviation of 3 in our sample, the potential cumulative effects of grandchildren on grandparents’ life satisfaction could be sizeable.
- (3) The raw association is significantly confounded by the age, health, and income of the respondent.
- (4) The positive correlation between life satisfaction and grandchildren varies by age group, maximizing when the respondents are in their 50s for women and in their 60s for men. The results are statistically more robust, however, for women than for men.
- (5) There is statistically insignificant relationship between the number of grandchildren and financial satisfaction.

2. Background and Motivation

There are perhaps no other studies in the psychological literature on well-being deemed so controversial by the general public as those which found that children do not generally make

us happy or become more satisfied with our life overall. Apart from a few notable exceptions (Kohler et al, 2005; Margolis & Myrskylä, 2011; Herbst & Ifcher, 2011), research in social science has found consistent evidence of either a zero or a negative correlation between the presence of children in a family and the respondent's self-rated well-being. For example, studies in the U.S. and Europe have found that parents often report slightly though statistically significantly lower levels of cognitive well-being such as marital satisfaction (White et al, 1986; Twenge et al, 2003) and life satisfaction (Powdthavee, 2008; Clark et al, 2008; Stanca, 2011), as well as affective well-being such as happiness (Alesina et al, 2004), mental health states (Cleary & Mechanic, 1983; Shields & Wheatley-Price, 2001; Clark & Oswald, 2002) and moment-to-moment feelings (Kahneman et al, 2004; White & Dolan, 2009) compared to nonparents.

One of the main reasons for the controversy around the insignificant and sometimes negative correlation between the happiness and life satisfaction of parents and their fertility is that it is deeply counterintuitive: Most of us would argue that, although raising kids is hard work, we are nevertheless happy with our children, for our children, and because of our children. Such beliefs are strong and prevalent across cultures, age groups, and genders (see, e.g., Blake, 1979; Baumeister, 1991). They are, however, frequently at odds with the scientific data. For example, when Americans were asked how their children have influenced their marital lives, the majority concluded that the presence of children had affected their marriage in the most positive light possible. Yet when the same individuals were asked to report how satisfied they are with their marriage, they reported lower levels of marital satisfaction than those either childless or childfree (Glenn & McLanahan, 1982).

According to psychologist Daniel Gilbert (2006), the discrepancy between what we believe ("Children *should* make us happier!") and what the data actually tells us could be explained using evolutionary as well as psychological theories. For example, given that people who

believe that there is no joy in parenthood – and who thus stop having or do not have children – are less likely to pass on their beliefs beyond their own generation, the belief that “children bring happiness and satisfaction” will transmit itself much more successfully from generation to generation than the belief that “children bring misery.” In other words, only the beliefs that have the best chance of transmission, even if they are faulty ones, will be passed on. In addition, when we believe that something makes us happy, we are willing to pay a high price for it. Yet it is also often the case that, when we pay a high price for something, we rationalize that its possession makes us happier than when we did not possess it. And given that evolution passes on this unconditional and invariable compulsion to care for our children, it is therefore not surprising that we tend to rationalize those costs and conclude that our children must be repaying us with a deep sense of satisfaction.

More recently, the theory on focusing illusion (FI) has been put forward by a number of scholars as a key psychological explanation for why we tend to over-predict the impacts of many events in our lives, including the positive effects of children on how parents evaluate how their lives have turned out (see, e.g., Schkade & Kahneman, 1999; Powdthavee, 2009). When prompted to think about parenthood – either imagining future offspring or thinking about their current ones – the majority of people will tend to focus more of their attention on the good and salient things about being a parent (e.g., seeing our kids smile for the first time) and less so on the bad and seemingly trivial things about being a parent (e.g., time spent changing dirty diapers and frequent anxiety about the welfare of our children), partly because of the transmitted belief that children bring happiness. However, this does not negate the fact that the less salient experiences of parenthood – e.g., having more housework to do (Sanchez & Thomson, 1997), time spent worrying about household finances (Stanca, 2011), and less quality time with spouse (Crohan, 1996; Lavee et al, 1996) – do add up and are therefore likely to have daily emotional consequences. Moreover, given that too-little weight will often

be placed on the less salient experiences about being a parent, it should come as no surprise that we tend to overestimate the impacts children have, or potentially have, on our overall life satisfaction whenever we are prompted to think about them.

What FI is implying is that the relationship between parenthood and life satisfaction is likely to be mediated by how the presence of children in the family affects parents' time-use and how their attentions are normally allocated on a daily basis. When individuals spend most of their time tending to the very core process of childcare and being directly responsible for their child's well-being, then it may well be the case that they will always report significantly lower levels of life satisfaction compared to nonparents irrespective of what they might say when asked how much of their happiness can be credited to their children. This explains why recent results have shown that the association between life satisfaction and children varies significantly with age, with individuals tending to report higher satisfaction of life with number of children as they age, i.e., when their children are grown up and therefore less economically independent. This raises an important social science question: If our usual predictions about the impact of children on parents' life satisfaction are made incorrectly, could our predictions regarding grandparenthood be any better?

One other rationale that is sometimes used by people to explain why they are adamant that parenting makes them happy is the possibility that they could become grandparents in the future. For older adults, grandchildren may provide not only the companionship and affection often expected from their own children but also incomparable joy from a sense of achievement, success, and a variety of pleasant experiences (Glenn & McLanahan, 1981). Moreover, considering that most grandparents – particularly in western societies – are often free from the direct financial and nonfinancial responsibilities of caring for their grandchildren's welfare, one may argue that the association between grandchildren and grandparents' life satisfaction may well be positive and statistically significantly different

from zero – simply because grandparents may enjoy the interaction with young children more when it no longer entails parental responsibilities (Stanca, 2011). Economists, by contrast, argue that there may generally be a demand for grandchildren for entirely different reasons. According to economists, the demand for grandchildren could be explained in part by the theory on “demonstration effect,” i.e., parents help their adult children financially because they believe that a child’s propensity to furnish parents with care can be conditioned by parental example (Cox & Stark, 2005). Since most parents would like to be treated well by their adult children, there is a resultant demand for grandchildren simply because potential grandparents are subject to better treatments by their adult children if the latter have their own children to whom to demonstrate the appropriate behavior. In other words, a positive association between life satisfaction and grandparenthood may have been driven by the better treatment grandparents receive from their adult children once they started having children of their own.

There have been two notable studies in this area: Kivnick (1982) and Thomas (1989). Based on qualitative data gathered from 30 grandparents and quantitative data gathered from 286 grandparents, Kivnick found activity level in the grandparent role to be generally unrelated to life satisfaction. By contrast, Thomas (1989) interviewed 301 grandparents about their relationship with their grandchildren and found a positive relationship between the components of being a grandparent – e.g., indulging grandchildren and the feeling of immortality through their grandchild – and life satisfaction. However, these two studies were based on small samples of grandparents, and the analyses were conducted without an appropriate control group (i.e., non-grandparents) as well as being primarily qualitative in nature. Currently, the literature in this particular area is limited and outdated (virtually none of the existing micro-econometric happiness or life satisfaction equations contains a

grandchildren or a grandparent variable as one of their explanatory variables), and the extent of the relationship between grandparenthood and life satisfaction is imperfectly understood.

3. Sampling process

a. Understanding Society survey

The data in this study is from Wave 1 of the Understanding Society survey (<http://www.understandingsociety.org.uk/>). This is a major longitudinal survey designed to provide new evidence about people in the U.K., their life experiences, behaviors, and beliefs. Having started in December 2009, the study follows 100,000 individuals from 40,000 households in Great Britain. The dependent variable used in the current study is from the responses to the life satisfaction question.

The life satisfaction question, which prompts survey respondents to rate themselves on a 7-point scale based on how satisfied or dissatisfied they are with their life overall, is considered by psychologists as a “gold standard” measure of a person’s cognitive well-being (Diener et al, 1985). It is formally defined as a global assessment of a person’s quality of life according to a standard that each individual sets for him or herself (Shin & Johnson, 1978). Responses are elicited using the following question:

“All things considered, how satisfied or dissatisfied are you with your life overall using a 1–7 scale? 1 = very dissatisfied, ..., 7 = very satisfied.”

Our main explanatory variable is derived from two survey questions. The first asks respondents to report the number of grandchildren that live elsewhere, and the responses are used to form the “The number of absent grandchildren” variable (*a_lvrel5*). The second question asks respondents to state their relationship with other household members (*a_relationship*). I then use this information to calculate the number of grandchildren living at

the same household as the respondent. The “Total number of grandchildren” variable is then the sum of these two variables.

The complete Understanding Society sample consists of 21,465 adults. However, not all will have children or go on to have children. Hence, I decided to restrict the sample to contain only those who are already parents, i.e., individuals who reported having at least one child either living in their household or elsewhere. This leaves us with a total sample of 13,234 individuals. Of those, 5,156 (or approximately 39%) are grandparents. Among the grandparents, there is a long tail in terms of distribution in the number of grandchildren; the majority (53%) has one to three grandchildren. In only 3% of cases do grandchildren live in the grandparents’ household. On average, grandparents are slightly more satisfied with their life than non-grandparents; the raw means (standard deviations) of life satisfaction for grandparents and non-grandparents are 5.430 (1.497) and 5.224 (1.423), respectively. We can reject the null hypothesis that the two means are statistically equal; t -statistic [p-value] = -8.023 [0.000]. Nevertheless, grandparents also tend to be significantly older, rate their health as better, and have less income than non-grandparents. Table 1 summarizes the descriptive statistics.

b. Accounting for selection bias

Although I am interested only in parents, some selection bias is likely to be involved in moving from having no children to parenthood. One could imagine, for instance, that people with children present specific characteristics that influence the way they are affected by their grandchildren compared to people with no children of their own.

To correct for any selection bias in moving from non-parenthood to parenthood, I compute an inverse Mills ratio using a selection variable that equals 1 if the person has at least one child, and 0 otherwise. This parenthood equation is estimated using the complete Understanding

Society sample, shown in the appendix, as a function of gender, age group, father's education, mother's education, log of household income, employment dummies (6), marital status dummies (4), years of schooling, household size, subjective health dummies (4), ethnic background dummies (5), regional dummies (11), dummy variables representing who the respondents lived with when they were 14 years old (7), and their interaction with age groups. The interaction variables between "who the respondent lived with at age 14" and age groups are used to satisfy the exclusion restrictions, which is possible as the structure of the family the respondents grew up with when they were 14 should influence their decision of when – if at all – to have children, but should not correlate with the number of grandchildren they will have in the future.

4. Life satisfaction and grandchildren

3.1. Overall average

Assume that there exists a generalized life satisfaction function

$$LS = f(G, A, H, Y, X | C), \quad (1)$$

where LS denotes life satisfaction (1 = very dissatisfied, ..., 7 = very satisfied). Conditioning on having children, C , life satisfaction is a function of the number of grandchildren (G), age (A), health (H), income (Y), and other socio-economic statuses (X). I assume that there are clear *ceteris paribus* associations between grandchildren and age (positive), grandchildren and health (negative), and grandchildren and household income (negative).

The micro-econometric life satisfaction equation, which is a counterpart of Eq.1, can be written as

$$LS_i = \alpha + \beta_1 G_i + \beta_2 C_i + \beta_3 A_i + \beta_4 A_i^2 + \beta_5 H_i + \beta_6 Y + \gamma X_i' + \delta \mu_i + \varepsilon_i, \quad (2)$$

where G is the individual i 's number of grandchildren, C is the number of children (the minimum here is 1), A and A^2 are age and age-squared respectively, H is self-assessed health, Y is log of household income, and μ represents the inverse Mills ratio or selection parameter. The vector of other socio-economic variables, X , includes gender, employment statuses, marital statuses, years of schooling, household size, ethnicity, and regional dummies. Since LS is an ordinal variable, Eq.2 is estimated using an ordered probit model with robust standard error, although qualitatively similar results can be obtained using a least-squares estimator.

Table 2 reports ordered probit estimates based on Eq.2. The first column presents a life satisfaction equation with only the number of grandchildren, the number of children, and the selection variable as controls. Here, the estimated coefficient on the number of grandchildren is positive and statistically significant at 0.039, with a well-determined standard error of 0.005. By contrast, the number of children is negatively and statistically significantly associated with self-reported life satisfaction. The selection variable enters the life satisfaction equation negatively and statistically significantly different from zero, thus suggesting that, in the most parsimonious form of the equation, selection into having children and life satisfaction are correlated.

The positive association between life satisfaction and the number of grandchildren may be the result of the omitted correlation between life satisfaction and age. To account for the age effect, the second column of Table 2 contains as controls a list of exogenous variables, which include gender, age, and age-squared. As anticipated, the size of the estimated coefficient on the number of grandchildren reduces from 0.039 to 0.010, although the coefficient continues to be statistically significant at the 10% level. Consistent with previous studies, men are less

satisfied with life than women are and life satisfaction is also U-shaped in age in the Understanding Society data (Blanchflower & Oswald, 2008).

Since older adults are more likely to have grandchildren and have worse health compared to younger adults, the third column introduces self-assessed health dummies as additional control variables. With the inclusion of health dummies as explanatory variables, the estimated coefficient on the number of grandchildren is now positive and statistically significant at the 5% level; the estimated coefficient is 0.022 with a standard error of 0.005. Inclusion of log of household income in Column 4 of Table 2 slightly improves the size of the coefficient from 0.022 to 0.025.

Column 5 reports the full specification, adding employment status, marital status, years of schooling, household size, ethnicity, and regional dummies. The estimated coefficient on the number of grandchildren continues to be positive and statistically significant at 0.015, with a standard error of 0.005.

Column 6 re-estimates Column 5's specification with the number of grandchildren separated into "the number of grandchildren living elsewhere" and "the number of grandchildren living at home." While both estimated coefficients are positive, only the coefficient on the number of grandchildren that live elsewhere is statistically significant. One reason for this may be that only a small number of grandchildren live in the same household as the respondent.

It is worth noting that the coefficients from the ordered probit model cannot be interpreted directly as marginal effects. Based on Column 5's estimates, I present in Figure 1 the estimated marginal effects of the number of grandchildren on life satisfaction. A unit increase in the number of grandchildren increases the probability of individuals reporting a "6" on the 7-point scale for life satisfaction by 0.25 percentage points, and a "7" or "very satisfied" with life by approximately 0.3 percentage points.

Given the distribution of the number of grandchildren and life satisfaction in our sample, however, the above marginal effects are not only statistically significant but also quantitatively important. The mean of the number of grandchildren is 4 and its standard deviation is 3. A move from one standard deviation below the mean to one standard deviation above the mean is therefore a change from 1 to 7. Taking a conservative marginal effect of grandchildren on grandparents reporting to be “very satisfied” with life to be 0.3-percentage point, the implied change in the latent satisfaction variable in this category is approximately 1.8-percentage points. Given the distribution of life satisfaction, this is a considerable effect. It is equivalent to switching gender from male to female; it is approximately equal to around half of the satisfaction associated with the move from being single to being married; and it is approximately equal to one-third of the satisfaction associated with the move from being employed full-time to retirement.

3.2. Interaction with age groups

According to Margolis and Myrskylä (2011), the association between life satisfaction and having children can vary significantly with the respondent’s age, with adults in their 40s reporting significantly higher satisfaction of life with number of children. This may also be the case with grandchildren. It is therefore possible to imagine that individuals completely adapt to grandparenthood as they age.

Table 3 reports the estimates with age-group dummies and their interaction with the number of grandchildren. The first two columns show how estimates vary by age group for the parent sample, while the final two columns present the results for women and men separately. Looking across the columns, we can see that the interaction effects are positive and statistically significant at conventional levels for all parents and for women, but not for men.

While the interaction coefficients are informative, what is important to the interpretation of the association between life satisfaction and grandchildren by age group is the sum of the coefficients on “the number of grandchildren” and “age group $j \times$ the number of grandchildren.” I report these figures and their standard errors in Table 4.

The results in Table 4 suggest that the association between life satisfaction and grandchildren is negative and statistically significant for young grandparents, i.e., aged between 31 and 40. This is perhaps expected, considering that the children of these individuals probably became parents very early in their lives. The association becomes positive and statistically significant at conventional levels for the 51–60 and 61–70 age groups for the “All parents” sample. For women, the sum of “the number of grandchildren” and “age group $j \times$ the number of grandchildren” is positive and statistically significant at the 5% level for the 51–60 age group. For men, the sum of “the number of grandchildren” and “age group $j \times$ the number of grandchildren” is positive and statistically significant at the 10% level for the 61–70 age group. What this implies is that the positive relationship between life satisfaction and grandchildren does not apply generally and depends on the age group of the respondents.

With respect to the quantitative importance of these estimates, one way to assess their magnitudes is through their estimated marginal effects. However, unlike in linear models, it is not straightforward to calculate the marginal effects of interaction variables in non-linear models (Ai & Norton, 2003). For this reason, I follow previous studies on well-being valuations (see, e.g., Powdthavee, 2008; Mentzakis, 2011) and calculate the monetary value (or shadow price) of grandchildren – i.e., the additional income required to compensate an average individual from ‘foregoing’ having one additional grandchild – using the estimated income coefficients obtained from the regression models (see the last row of Table 4). On average, having one additional grandchild is equivalent to approximately $= 0.031/0.113 =$

0.27% increase in household income in terms of life satisfaction for the respondents from the “51 to 60” age group. This is more than twice as large – although it continues to be small in absolute size – as the equivalent monetary value of grandchildren we obtained across all age groups, e.g., a 0.1% increase in income is worth the same in life satisfaction as one additional grandchild across all age groups (see Table 3). For women of the same age group ($50 < \text{age} \leq 60$), the estimated monetary value of one additional grandchild is $= 0.031/0.119 = 0.26\%$. For men from the “61 to 70” age group, the monetary value of one additional grandchild is $= 0.023/0.113 = 0.20\%$.

3.3. Financial satisfaction

Stanca (2011) argues that the negative effect of children on parents’ life satisfaction can be explained by a large adverse impact on financial satisfaction that dominates the positive effects of non-financial satisfaction. Provided that grandparents are not directly responsible for their grandchildren’s welfare, one hypothesis is that there should not be a statistically significant correlation between the number of grandchildren and financial satisfaction once the differences in income across households are controlled for. In other words, the potential *net* impact of grandchildren on grandparents’ life satisfaction – i.e. the non-financial benefit [+ve] – the adverse financial impact [zero] – should be positive.

I test this hypothesis in Table 5 by re-estimating Table 3’s specification with financial satisfaction as the dependent variable and report the linear combination of the interaction terms in Table 6. The financial satisfaction question in the Understanding Society survey asks individuals to indicate on a 7-point scale how satisfied or dissatisfied they are with their household income (1 = “very dissatisfied”, ..., “7 = “very satisfied”).

Looking at the first column of Table 5, we can see that the number of grandchildren enters the financial satisfaction equation in a negative albeit statistically insignificant manner. The estimated coefficient on grandchildren is -0.002 and a standard error of 0.005; hence, as anticipated, it appears that we cannot reject the null hypothesis of a zero correlation between grandchildren and financial satisfaction. Consistent with Table 3's estimates, the coefficient on the number of grandchildren is negative albeit only marginally significant at the 10% level in a specification that incorporate the interaction terms between the number of grandchildren and age groups. The negative relationship between grandchildren and financial satisfaction is much more precisely estimated in the women sample (the estimated coefficient is -0.257 with a well-determined standard error of 0.082), thus suggesting that there may be a significant financial burden for young grandmothers, i.e. the "baseline" group ($30 < \text{age} \leq 40$).²

Table 6 reports the results for the rest of the age groups. Whist the number of grandchildren correlates positively with life satisfaction for the "51-60" age group in the full sample (which is primarily driven by the female sample), the association between the number of grandchildren and financial satisfaction is statistically insignificantly different from zero for this group as well as for almost other age groups in our sample. In short, I find no empirical evidence to suggest that there is an adverse impact of the number of grandchildren on grandparents' financial satisfaction, one that is both sizeable and statistically important.

5. Discussions and Conclusions

There is currently a vast body of literature attempting to explain and establish the relationship between parenthood and happiness. Yet very little attention has been paid to the role of

² It is worth noting that the number of children is not associated negatively and statistically significantly with financial satisfaction. This is in contrast to the results found by Stanca (2011). However, this may be due the fact that I only use parents in the analysis and the negative and statistically important impact of children on financial satisfaction may have been the result from comparing between parents and nonparents.

another important family relationship in our subjective well-being: The association between grandparenthood and our satisfaction with life overall. Using the recently released first wave of the U.K. Understanding Society data set, this study investigates whether there is a positive and statistically important relationship between life satisfaction and grandchildren, conditioning on selection into parenthood. I present one of the first pieces of microeconomic evidence that, on average, the number of grandchildren is associated positively and statistically significantly with how individuals rate their overall life satisfaction, *ceteris paribus*. However, the average marginal effect is small; across the entire parent sample, an additional grandchild is associated with an increase in the probability of individuals reporting to be “very satisfied” with life of approximately 0.3%. Furthermore, I find that this correlation tends to vary with age, with the size of the relationship being largest for those who are in their 50s and 60s.

What explains the positive association between life satisfaction and grandparenthood? One possible explanation – and which is also reflected in our results – is that grandparents, compared to parents, are freer from financial and nonfinancial responsibilities associated with looking after young children and teenagers (Stanca, 2011). This is likely to be the case in the U.K., given that 97% of grandparents in our sample do not live with their grandchildren. I also document evidence that the correlation between life satisfaction and grandchildren is strongest when respondents are in their 50s and 60s. This seems to make sense as it implies that grandparents are perhaps happiest when their grandchildren have recently been born or are still very young. Interestingly, this result contrasts with the overall conclusion found in the literature on the association between life satisfaction and individual’s own experience of becoming a parent: parents are, on average, least satisfied with their lives one or two years after the birth of their child (Clark et al, 2008).

One important question is to what extent is the estimated relationship causal? Compared to the parenthood decision, the number of grandchildren one goes on to have in life is perhaps considerably less of a choice variable. Unless the parenthood decision is significantly influenced by our parents, then – after conditioning on the observable characteristics that are likely to correlate with both grandparenthood and life satisfaction – our final estimates should be close to the true effect of grandchildren on satisfaction with life overall. I am aware, however, that this is probably too strong an assumption. In many cultures, parental support may play a significant role in influencing their offspring’s fertility decision (Kaptjin et al, 2010).

This paper is not without limitations. One limitation is that I have only the first wave of the Understanding Society data set. In the absence of longitudinal data, relatively little can be done to eliminate unobserved heterogeneity bias, which may simultaneously determine both the number of grandchildren and life satisfaction. Moreover, I was unable to comment on the question of whether or not there is hedonic adaptation to having grandchildren. Another limitation is that the frequency of contacts between grandchildren and grandparents was not controlled for in the estimation. It may well be the case that the estimated relationship between life satisfaction and grandparenthood is a function of how often respondents are paid a visit by their grandchildren.

Since the Understanding Society is a longitudinal data by design, more survey waves are perhaps required in order to establish whether the results will continue to hold under a fixed-effects setting. Nevertheless, all of this implies that we need to treat the estimated association provided in this article between grandparenthood and life satisfaction with care.

Overall, the conclusion is that, at least for the U.K. population, there may be a long-term psychological payoff to becoming grandparents even when there is generally an insignificant

association between the parenthood decision and the way we evaluate our life satisfaction. However, more evidence – both longitudinally and across nations – is needed in order to make the results conclusive.

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Table 1: Descriptive statistics of the Understanding Society survey 2010

	All	No grandchildren	At least one grandchild
Number of grandchildren	1.583 (2.770)	-	4.072 (3.100)
Number of children	3.595 (2.307)	2.672 (1.669)	5.046 (2.410)
Overall life satisfaction	5.303 (1.455)	5.223 (1.422)	5.430 (1.497)
Financial satisfaction	4.548 (1.695)	4.467 (1.683)	4.678 (1.706)
Age	52.428 (16.082)	44.238 (13.155)	65.302 (11.043)
Male	0.403 (0.490)	0.404 (0.490)	0.402 (0.490)
Subjective health	2.704 (1.159)	2.524 (1.103)	2.988 (1.189)
Ln(household income)	7.773 (0.776)	7.922 (0.754)	7.540 (0.751)
Retired	0.277 (0.447)	0.094 (0.293)	0.565 (0.495)
Married	0.639 (0.480)	0.636 (0.481)	0.644 (0.478)
Year of schooling	16.000 (1.255)	16.323 (1.188)	15.492 (1.188)
<i>N</i>	13,234	8,180	5,156

Table 2: Ordered probit life satisfaction equations with the number of grandchildren as an explanatory variable

Dependent variable: Life satisfaction	(1)	(2)	(3)	(4)	(5)	(6)
Number of grandchildren	0.039 [0.005]**	0.010 [0.005]+	0.022 [0.005]**	0.025 [0.005]**	0.015 [0.005]**	
Number of grandchildren						
Living elsewhere						0.014 [0.005]**
Living in the same household						0.025 [0.070]
Number of children [Min.=1]	-0.012 [0.006]*	-0.019 [0.006]**	-0.009 [0.006]	-0.006 [0.006]	0.005 [0.006]	0.005 [0.006]
Inverse Mill's ratio	-0.129 [0.031]**	-0.059 [0.034]+	-0.070 [0.033]*	-0.067 [0.033]*	-0.018 [0.062]	-0.020 [0.062]
Age		-0.010 [0.004]*	-0.013 [0.004]**	-0.021 [0.004]**	-0.017 [0.005]**	-0.017 [0.005]**
Age-square/100		0.019 [0.004]**	0.025 [0.004]**	0.033 [0.004]**	0.021 [0.005]**	0.021 [0.005]**
Male		-0.069 [0.019]**	-0.068 [0.019]**	-0.084 [0.019]**	-0.092 [0.020]**	-0.092 [0.020]**
Health: Very good			-0.247 [0.029]**	-0.236 [0.029]**	-0.232 [0.030]**	-0.232 [0.030]**
Health: Good			-0.499 [0.030]**	-0.476 [0.030]**	-0.465 [0.031]**	-0.465 [0.031]**
Health: Fair			-0.843 [0.035]**	-0.807 [0.036]**	-0.773 [0.036]**	-0.773 [0.036]**
Health: Poor			-1.377 [0.048]**	-1.333 [0.048]**	-1.217 [0.052]**	-1.217 [0.052]**
Ln(household income)				0.126 [0.014]**	0.111 [0.016]**	0.112 [0.016]**
Self-employed					0.005 [0.035]	0.005 [0.035]
Unemployed					-0.127 [0.051]*	-0.127 [0.051]*
Retired					0.276 [0.038]**	0.276 [0.038]**
On maternity leave					0.191 [0.097]*	0.190 [0.097]*
Looking after family/home					0.062 [0.041]	0.061 [0.041]
Full-time student					0.269 [0.112]*	0.269 [0.112]*
Disabled/long-term sick					-0.346 [0.058]**	-0.346 [0.058]**

Married					0.240	0.240
					[0.045]**	[0.045]**
Separated					-0.111	-0.112
					[0.069]	[0.069]
Divorced					-0.026	-0.027
					[0.053]	[0.053]
Widowed					-0.018	-0.019
					[0.063]	[0.063]
Years of schooling					-0.021	-0.021
					[0.009]*	[0.009]*
Household size					-0.046	-0.047
					[0.013]**	[0.014]**
Race: Mixed race					-0.240	-0.240
					[0.119]*	[0.119]*
Race:						
Indian/Bangladeshi/Pakistani					-0.184	-0.184
					[0.066]**	[0.066]**
Race: Chinese and other Asians					-0.022	-0.022
					[0.099]	[0.099]
Race: Black Africans & Caribbean					-0.105	-0.105
					[0.076]	[0.076]
Race: Other ethnic background					-0.175	-0.175
					[0.119]	[0.119]
Regional dummies	No	No	No	No	Yes	Yes
Observations	13234	13234	13234	13234	13234	13234
Log-likelihood	-20666.1	-20556.3	-19831.8	-19784.9	-19603.6	-19603.6

Note: + < 10%; * < 5%; ** < 1%. Robust standard errors are parentheses. Dependent variable is overall life satisfaction measured on a 7-point scale (1="very dissatisfied", ..., 7 = "very satisfied"). Baseline groups are: female, health: excellent; full-time employment; never married; race: white.

Table 3: Ordered probit life satisfaction equations with interactions between age groups and the number of children

Dependent variable: Life satisfaction	All	All	Women	Men
Number of grandchildren	0.011 [0.005]*	-0.175 [0.082]*	-0.257 [0.109]*	-0.041 [0.112]
Number of children [Min.=1]	0.004 [0.006]	0.006 [0.006]	0.005 [0.008]	0.010 [0.009]
Inverse Mill's ratio	-0.039 [0.072]	-0.041 [0.072]	-0.020 [0.088]	-0.301 [0.126]*
Age group: 20 and younger	0.213 [0.150]	0.208 [0.150]	0.259 [0.173]	0.322 [0.291]
Age group: 20<age<=30	0.100 [0.044]*	0.093 [0.044]*	0.087 [0.054]	0.189 [0.080]*
Age group: 40<age<=50	-0.055 [0.029]+	-0.055 [0.029]+	-0.045 [0.037]	-0.086 [0.046]+
Age group: 50<age<=60	0.054 [0.035]	0.015 [0.036]	0.050 [0.048]	-0.055 [0.055]
Age group: 60<age<=70	0.232 [0.049]**	0.216 [0.053]**	0.208 [0.074]**	0.161 [0.080]*
Age group: 70<age<=80	0.353 [0.061]**	0.382 [0.070]**	0.354 [0.095]**	0.367 [0.107]**
Age group: over 80	0.270 [0.079]**	0.320 [0.100]**	0.321 [0.134]*	0.271 [0.153]+
Age group: 20<age<=30 x Number of grandchildren		[dropped]	[dropped]	[dropped]
Age group: 40<age<=50 x Number of grandchildren		0.159 [0.084]+	0.239 [0.110]*	0.038 [0.117]
Age group: 50<age<=60 x Number of grandchildren		0.206 [0.083]*	0.288 [0.109]**	0.068 [0.114]
Age group: 60<age<=70 x Number of grandchildren		0.188 [0.083]*	0.263 [0.109]*	0.064 [0.113]
Age group: 70<age<=80 x Number of grandchildren		0.177 [0.083]*	0.260 [0.109]*	0.041 [0.113]
Age group: over 80 x Number of grandchildren		0.172 [0.084]*	0.255 [0.110]*	0.039 [0.116]
Socio-economic controls	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
Observations	13234	13234	7901	5392
Pseudo R-squared	0.0548	0.0552	0.0558	0.0570
Log-likelihood	-19669.7	-19662.3	-11736.1	-7890.8

Note: + < 10%; * < 5%; ** < 1%. Robust standard errors are parentheses. Baseline group is “age group: 30<age<=40”.

Table 4: Estimated life satisfaction coefficients of linear combinations of Table 3's interaction terms

Estimated coefficients	All	Women	Men
No. of grandchildren for 30<age<=40 age group	-0.175 (0.082)*	-0.257 (0.108)*	-0.041 (0.112)
No. of grandchildren + Interaction with 40<age<=50	-0.015 (0.018)	-0.017 (0.021)	0.037 (0.116)
No. of grandchildren + Interaction with 50<age<=60	0.031 (0.011)**	0.031 (0.013)*	0.027 (0.017)
No. of grandchildren + Interaction with 60<age<=70	0.013 (0.008)+	0.005 (0.010)	0.023 (0.012)+
No. of grandchildren + Interaction with 70<age<=80	0.002 (0.009)	0.003 (0.012)	0.0004 (0.014)
No. of grandchildren + Interaction with over 80	-0.002 (0.015)	-0.002 (0.019)	-0.002 (0.030)
Income coefficient			
Ln(household income)	0.113 (0.017)**	0.119 (0.021)**	0.113 (0.027)**

Note: + < 10%; * < 5%; ** < 1%. Robust standard errors are parentheses.

Table 5: Ordered probit financial satisfaction equations with interactions between age groups and the number of children

Dependent variable: Financial satisfaction	All	All	Women	Men
Number of grandchildren	-0.002 [0.005]	-0.136 [0.081]+	-0.257 [0.082]**	0.076 [0.134]
Number of children [Min.=1]	0.000 [0.005]	0.002 [0.005]	-0.001 [0.007]	0.005 [0.008]
Inverse Mill's ratio	-0.071 [0.072]	-0.062 [0.072]	-0.097 [0.090]	-0.155 [0.126]
Age group: 20 and younger	-0.012 [0.158]	-0.034 [0.158]	-0.005 [0.173]	0.220 [0.379]
Age group: 20<age<=30	-0.077 [0.043]+	-0.086 [0.043]*	-0.062 [0.052]	-0.104 [0.081]
Age group: 40<age<=50	0.026 [0.029]	0.023 [0.029]	0.035 [0.038]	0.005 [0.047]
Age group: 50<age<=60	0.194 [0.035]**	0.170 [0.037]**	0.198 [0.049]**	0.131 [0.057]*
Age group: 60<age<=70	0.311 [0.048]**	0.322 [0.051]**	0.331 [0.072]**	0.299 [0.076]**
Age group: 70<age<=80	0.499 [0.059]**	0.478 [0.067]**	0.575 [0.092]**	0.372 [0.102]**
Age group: 80 and over	0.650 [0.076]**	0.616 [0.091]**	0.716 [0.120]**	0.500 [0.147]**
Age group: 20<age<=30 x Number of grandchildren		[dropped]	[dropped]	[dropped]
Age group: 40<age<=50 x Number of grandchildren		0.116 [0.082]	0.251 [0.084]**	-0.122 [0.138]
Age group: 50<age<=60 x Number of grandchildren		0.144 [0.081]+	0.269 [0.082]**	-0.072 [0.135]
Age group: 60<age<=70 x Number of grandchildren		0.126 [0.081]	0.243 [0.082]**	-0.075 [0.135]
Age group: 70<age<=80 x Number of grandchildren		0.135 [0.081]+	0.249 [0.082]**	-0.065 [0.135]
Age group: over 80 x Number of grandchildren		0.138 [0.081]+	0.269 [0.083]**	-0.091 [0.137]
Socio-economic controls	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
Observations	13212	13212	7844	5368
Pseudo R-squared	0.0589	0.0590	0.0584	0.0637
Log-likelihood	-22492.4	-22489.3	-13438.6	-9000.4

Note: + < 10%; * < 5%; ** < 1%. Robust standard errors are parentheses. Dependent variable is financial satisfaction measured on a 7-point scale (1="very dissatisfied", ..., 7 = "very satisfied"). Baseline group is "age group: 30<age<=40".

Table 6: Estimated financial satisfaction coefficients of linear combinations of Table 5's interaction terms

Estimated coefficients	All	Women	Men
No. of grandchildren for 30<age<=40 age group	-0.136 (0.081)+	-0.257 (0.082)**	0.076 (0.134)
No. of grandchildren + Interaction with 40<age<=50	-0.018 (0.020)	-0.006 (0.023)	-0.045 (0.033)
No. of grandchildren + Interaction with 50<age<=60	0.009 (0.010)	0.012 (0.012)	0.003 (0.015)
No. of grandchildren + Interaction with 60<age<=70	-0.009 (0.007)	-0.013 (0.099)	0.0004 (0.0004)
No. of grandchildren + Interaction with 70<age<=80	-0.0004 (0.010)	-0.007 (0.012)	0.011 (0.013)
No. of grandchildren + Interaction with over 80	0.005 (0.014)	0.013 (0.015)	-0.015 (0.027)

Note: + < 10%; ** < 1%. Robust standard errors are parentheses.

Appendix A: Probit selection equation into parenthood

Explanatory variables		Explanatory variables (<i>continued</i>)	
Male	-0.204 [0.024]**	Father/no mother figure x Age group: 80 and over	[dropped]
Age group: 20<age<=30	1.376 [0.128]**	In foster care x Age group: 20<age<=30	-1.448 [0.797]+
Age group: 30<age<=40	2.06 [0.129]**	In foster care x Age group: 30<age<=40	-1.013 [0.811]
Age group: 40<age<=50	2.333 [0.132]**	In foster care x Age group: 40<age<=50	-1.43 [0.776]+
Age group: 50<age<=60	2.546 [0.137]**	In foster care x Age group: 50<age<=60	-2.279 [0.781]**
Age group: 60<age<=70	2.994 [0.145]**	In foster care x Age group: 60<age<=70	-2.01 [0.784]*
Age group: 70<age<=80	2.94 [0.152]**	In foster care x Age group: 70<age<=80	-1.409 [0.816]+
Age group: 80 and over	2.761 [0.160]**	In foster care x Age group: 80 and over	[dropped]
Living with at age 14		Other living arrangements x Age group: 20<age<=30	-0.071 [0.893]
Adoptive mother and father	0.27 [0.448]	Other living arrangements x Age group: 30<age<=40	-0.824 [0.895]
Mother and stepfather	0.369 [0.230]	Other living arrangements x Age group: 40<age<=50	-0.58 [0.900]
Father and step mother	0.733 [0.470]	Other living arrangements x Age group: 50<age<=60	-0.554 [0.900]
Mother/no father figure	0.59 [0.179]**	Other living arrangements x Age group: 60<age<=70	-0.988 [0.894]
Father/no mother figure	0.879 [0.357]*	Other living arrangements x Age group: 70<age<=80	-0.337 [0.902]
In foster care	1.897 [0.688]**	Other living arrangements x Age group: 80 and over	0.007 [0.949]
Other living arrangements	0.628 [0.873]	Father's education	

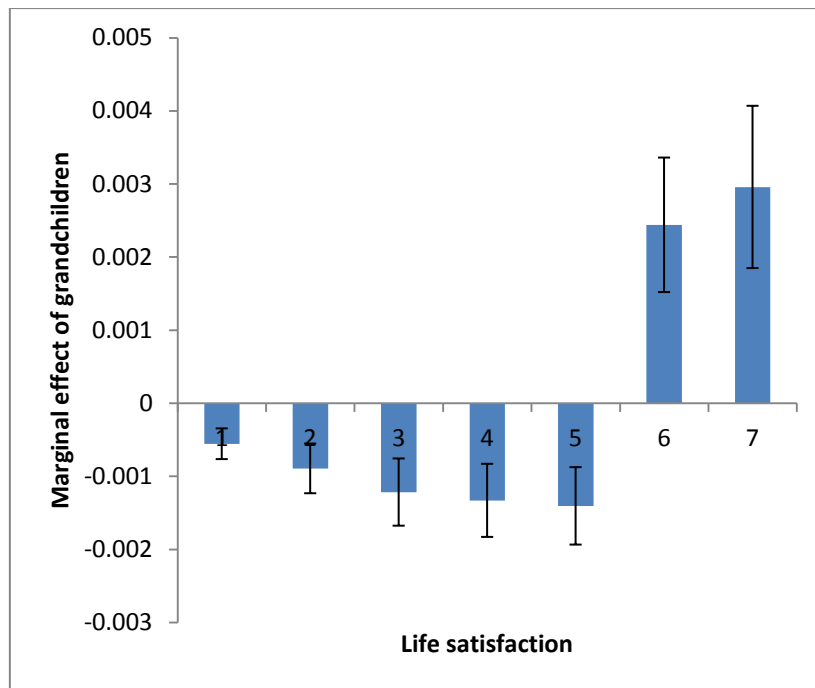
Interactions			
Adoptive mother and father x Age group: 20<age<=30	-0.01 [0.526]	Left school with some qualifications	-0.035 [0.055]
Adoptive mother and father x Age group: 30<age<=40	0.211 [0.517]	Gained post-school qualifications or certificates	-0.026 [0.052]
Adoptive mother and father x Age group: 40<age<=50	-0.319 [0.506]	Gained university degree or higher	-0.149 [0.077]+
Adoptive mother and father x Age group: 50<age<=60	-0.355 [0.558]	Other qualifications	0.133 [0.296]
Adoptive mother and father x Age group: 60<age<=70	-0.045 [0.569]	Don't know	0.019 [0.066]
Adoptive mother and father x Age group: 70<age<=80	-0.08 [0.705]	Mother's education	
Adoptive mother and father x Age group: 80 and over	[dropped]	Left school with some qualifications	0.028 [0.049]
Mother and stepfather x Age group: 20<age<=30	-0.09 [0.252]	Gained post-school qualifications or certificates	-0.036 [0.059]
Mother and stepfather x Age group: 30<age<=40	-0.022 [0.257]	Gained university degree or higher	-0.071 [0.086]
Mother and stepfather x Age group: 40<age<=50	-0.04 [0.280]	Other qualifications	-0.778 [0.281]**
Mother and stepfather x Age group: 50<age<=60	-0.369 [0.294]	Don't know	-0.056 [0.064]
Mother and stepfather x Age group: 60<age<=70	-0.271 [0.317]	Health: Very good	0.069 [0.034]*
Mother and stepfather x Age group: 70<age<=80	-0.145 [0.431]	Health: Good	0.153 [0.035]**
Mother and stepfather x Age group: 80 and over	0.003 [0.511]	Health: Fair	0.03 [0.042]
Father and stepmother x Age group: 20<age<=30	-0.304 [0.535]	Health: Poor	0.138 [0.059]*
Father and stepmother x Age group: 30<age<=40	-0.758	Ln(household income)	-0.258 [0.020]**
		Self-employed	-0.017

	[0.532]		[0.046]
Father and stepmother x Age group: 40<age<=50	-0.966 [0.531]+	Unemployed	-0.024 [0.057]
Father and stepmother x Age group: 50<age<=60	-0.505 [0.565]	Retired	-0.218 [0.055]**
Father and stepmother x Age group: 60<age<=70	[dropped]	On maternity leave	1.087 [0.171]**
Father and stepmother x Age group: 70<age<=80	-0.527 [0.582]	Looking after family/home	1.03 [0.099]**
Father and stepmother x Age group: 80 and over	[dropped]	Full-time student	-0.876 [0.096]**
Mother/no father figure x Age group: 20<age<=30	-0.315 [0.196]	Disabled/long-term sick	-0.024 [0.067]
Mother/no father figure x Age group: 30<age<=40	-0.365 [0.202]+	Married	1.136 [0.032]**
Mother/no father figure x Age group: 40<age<=50	-0.639 [0.203]**	Separated	1.426 [0.080]**
Mother/no father figure x Age group: 50<age<=60	-0.455 [0.214]*	Divorced	1.371 [0.048]**
Mother/no father figure x Age group: 60<age<=70	-0.685 [0.215]**	Widowed	1.416 [0.062]**
Mother/no father figure x Age group: 70<age<=80	-0.606 [0.231]**	Years of schooling	-0.104 [0.011]**
Mother/no father figure x Age group: 80 and over	-0.743 [0.273]**	Household size	0.558 [0.019]**
Father/no mother figure x Age group: 20<age<=30	-0.527 [0.408]	Race: Mixed race	-0.072 [0.122]
Father/no mother figure x Age group: 30<age<=40	-0.722 [0.411]+	Race: Indian/Bangladeshi/Pakistani	-0.563 [0.075]**
Father/no mother figure x Age group: 40<age<=50	-1.096 [0.423]**	Race: Chinese and other Asians	-0.132 [0.097]
Father/no mother figure x Age group: 50<age<=60	-0.763 [0.429]+	Race: Black Africans & Caribbean	0.306 [0.094]**

Father/no mother figure x Age group: 60<age<=70	-0.687 [0.509]	Race: Other ethnic background	-0.024 [0.127]
Father/no mother figure x Age group: 70<age<=80	-0.866 [0.486]+	Constant	0.033 [0.263]
		Regional dummies	Yes
		Observations	21465
		R-squared	0.4528
		Log-likelihood	-7047.73

Note: + < 10%; * < 5%; ** < 1%. Robust standard errors are parentheses. Dependent variable is an indicator variable of parenthood (=1 if the respondent has at least one child and 0 otherwise). Baseline groups are: living with biological father and mother at age 14; father education: no formal education; mother education: no formal education.

Figure 1: Marginal effects of grandchildren on life satisfaction



Note: The estimates are based on Column 5 of Table 2's specification.