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Are Grandchildren Good for You?

Well-Being and Health Effects of Becoming a Grandparent [1]

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Abstract

Becoming a grandparent is one of the major life transitions experienced by older individuals. Using data from ten Western European countries, we show that grandparenthood on average leads to a reduction in well-being while hardly impacting physical, cognitive and mental health. Effects are heterogeneous, though. Reductions in well-being appear among those having less family contact and not providing child care. Those with the opposite profile – except grandmothers providing daily child care – experience some health improvements without reduced well-being. Well-being reductions are not driven by unwanted/unplanned children. Grandparenthood induces people to retire, but retirement seems no relevant channel for well-being and health effects.

1 Introduction

Due to the demographic transition, the interest in the health and well-being of the older generation has increased. There is a burgeoning literature on the health effects of the transition into retirement (cf. Nishimura et al., 2018; Mazzona & Peracchi, 2017) and of a negative health shock to or loss of a spouse (cf. Siflinger (2017), Van den Berg et al. (2011) and Wu (2003)). Less interest has been shown towards a third major life transition: the transition into grandparenthood, although the grandparent role is considered one of the most important roles in the life of older individuals and has been changing over the past decades. Individuals are transitioning into grandparenthood later in life as a result of postponed fertility, however due to gains in longevity, the time spent as a grandparent has increased (Margolis & Wright, 2017).

There are many implications of grandparenthood that are not well understood. One of the few lines of research focuses on the effects of grandparent-provided child care on parents, finding that maternal labor supply increases when grandparents provide child care (cf. García-Morán & Kuehn (2017) and Dimova & Wolff (2011)). Effects of grandparenthood on the grandparents themselves, however, have received relatively little attention thus far. Recently, some research has shown that having grandchildren comes at the cost of fewer social activities and lower labor supply of grandparents, especially grandmothers (Backhaus & Barslund, 2019; Rupert & Zanella, 2018; Frimmel et al., 2021). A few correlational studies found that having grandchildren is associated with higher life satisfaction (Arpino et al., 2018; Powdthavee, 2011), while other research found that having grandchildren comes with increases in mortality, especially among those who become grandparents at a younger age (Christiansen, 2014). Some studies specifically focused on how care-giving to grandchildren correlates with grandparental health, although most of these studies are not able to determine causality, and results are mixed (Brunello & Rocco, 2019; Arpino & Bordone, 2014; Ku et al., 2012).

The contribution of our research is that we are, to our knowledge, the first to conduct a comprehensive investigation of the causal relationship between the transition to grandparenthood and the health and well-being of older individuals. From a descriptive viewpoint, it is important to understand the effects of this transition that occurs so commonly, and that marks the start of a new phase in life. The research topic, however, also has policy relevance. There is an increased policy focus on ways to improve the health, quality of life and active contribution to society of older individuals as the population ages. This is the concept of an active aging policy framework that is promoted by the World Health Organization (WHO, 2002). As populations age, economies have to reorganize themselves to ensure continued economic growth and prosperity. While it will be

important to restructure the labor force on the one hand, it is also important to consider how older individuals can be integrated and kept as contributing members of society. One possible contribution can come through their role as grandparents. The increasing labor force participation of women is increasing the share of households in which both partners work, which in turn increases the need for child care. Since people live longer and stay in good health for a longer time, older people may provide a substitute for formal child care. The extent to which they do so depends not only on their health, but also on the availability of formal child care and its pricing (which often involves subsidizing). Child care related policy decisions can therefore influence the amount of child care that is provided by grandparents. These policies may have unintended consequences for the health and well-being of the grandparents. Taking care of grandchildren may on the one hand provide joy and a feeling of a new purpose in life, but on the other hand can also be strenuous. It may therefore have (positive or negative) knock-on effects on grandparental health and health care costs.

Identifying the causal relationship between grandparenthood and the health and well-being of older individuals is not straightforward, as the moment at which someone becomes a grandparent may be endogenous. Omitted variable bias may arise from variables including current age, age at birth of one's own first child and number of children, as well as socioeconomic factors. In addition, factors including how close children live to their parents and the quality of their relationship may simultaneously affect the health and well-being of the older generation and the fertility decisions of the younger generation. Our strategy to deal with these sources of bias is the use of individual fixed effects, which allow us to rely on within-subject variation to identify the effects of becoming a grandparent. We rigorously test whether there is potential bias from time-varying factors, where the main concern is that prospective parents may alter their fertility behavior in response to health shocks to their own parents. A further contribution of our work is that we study several potentially important underlying heterogeneities and channels. For example, the effects of grandparenthood on well-being and health may be driven by how close the relation between older individuals and their family is, and whether they take care of their grandchildren.

Using longitudinal data of 10 Western European countries from the Survey of Health, Ageing and Retirement in Europe (SHARE), we find that the transition into grandparenthood on average leads to a somewhat worse well-being and among females also self-assessed health. The pattern of results throughout all analyses suggests that this reduction in self-assessed health should not be seen as a genuine health effect, but rather reflects a change in well-being that leads people to re-assess their general health. Mental, physical, and cognitive health are unaffected by grandparenthood, or improve.

The decrease in well-being is not driven by cases in which the family expansion was unwanted or unplanned for by the middle generation. Instead, family closeness appears to be an essential dimension. The negative well-being effects are concentrated among older individuals who had less close contact to their children, and who did not provide childcare. Those with closer contact, and those who do provide childcare do not experience these negative effects, but instead experience some health improvements. An exception is formed by females who daily take care of grandchildren: for them grandparenthood leads to a decrease in well-being, suggesting that daily care-taking is burdensome.

We expected that changes in the activity levels of older individuals could be a major driver of effects. We do find that cognitive performance improves among those who regularly take care of grandchildren, suggesting an increase in cognitive activation. We however find no effects on whether older individuals engage in moderate levels of physical activities. Grandparenthood does reduce the probability that an older individual engages in vigorous physical activities. This may contribute to the decrease in well-being but apparently leaves variables such as grip strength and limitations to (instrumental) activities of daily living unaffected.

Finally, we document that grandparenthood leads to increases in the probability to be in close contact with one's own children, and induces people, especially males, to retire.

Our results should be understood as first results on the effects of grandparenthood, which is the third commonly experienced transition among older individuals, next to the better studied events of retirement and death of a spouse. Our research does not answer all questions on the effects of grandparenthood, but it provides a start. Getting to a better understanding of the ways in which grandparenthood affects older individuals is not only important from a health and well-being perspective, but may also help improve active aging policies, including policies nudging older individuals to continue working or to provide childcare.

The rest of the paper is structured as follows: Section 2 provides background information, discusses potential channels through which grandparenthood may affect the health of grandparents and provides a literature review. Section 3 describes the data and the sample that we use. The methods are also explained in Section 3. Section 4 presents the main results, while Section 5 investigates potential channels and heterogeneities. Section 6 concludes this paper.

2 Background & Contribution

2.1 Trends in Grandparenthood

The effects of grandparenthood on the health and well-being of older individuals can be considered from the viewpoint of the larger concept of active aging, which has gained prominence given current demographic trends. Over the past decades, the population share of individuals aged 65 and older has risen considerably in the European Union, from 13.5% in 1990 to 20.8% in 2020 (World Bank, 2021). This in turn has led to discussions on the effects of an aging society on economic growth. As individuals age, they stop working and are thereby no longer economically productive. At the same time, they increase societies' health care expenditures. To counteract this negative trend, the World Health Organization (WHO) promotes active aging, which it defines as "…the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age" (WHO, 2002). According to the WHO, promotion of active aging involves policies and programs that promote physical health, but also mental health and social connections. For many individuals, one important part of aging is grandparenthood, which may affect all three factors. Understanding how the roles and tasks that grandparents take on affect their well-being as well as physical and mental health, may therefore have important implications for policy environments, including active aging policies, child care policies as well as retirement policies.

Grandparenthood has changed in recent decades due to demographic and societal changes. These changes have had a very large impact on both the number of years people can expect to be a grandparent and on qualitative aspects of grandparenthood. People's average age at first birth has increased over the past decades, so that individuals are transitioning into grandparenthood later in life. However, this delayed fertility effect is more than offset by increases in life expectancy, so that people are spending more years as grandparents (Margolis & Wright, 2017). It is important to note that not only did the average number of years spent as a grandparent increase, but the number of years as healthy grandparents increased as well. Margolis & Wright (2017) show that between 1992-94 and 2010, the time spent as a grandparent increased by 3.0 (2.4) years for men (women) in the USA, while the time spent as a healthy grandparent increased by almost the same: 2.6 (3.0) years for men (women).

Grandparenthood has also changed in a qualitative sense. Declining fertility rates result in fewer grandchildren, allowing more intense relationships to be formed. In most developed countries, many grandparents are involved in providing care for their grandchildren (Di Gessa et al., 2016; Geurts et al., 2015). Increasing labor market participation of mothers, which is increasing demands

for child care, certainly plays an important role in this (Geurts et al., 2015). At the same time, a counteracting trend may result from recent increases in retirement ages, which means more grandparents are still working when they transition into grandparenthood. Increasing retirement ages have been found to decrease care provided by grandmothers (Aparicio-Fenoll & Vidal-Fernandez, 2015). In response, there are a few countries, such as the UK, that have discussed the possibility to extend parental leave arrangements to grandparents. Other policy responses include subsidizing grandparent provided care (as is already the case in the Netherlands) and more flexible working schedules or retirement schemes so that grandparents can help with care provision. Another counteracting trend is increased mobility and migration, which is increasing the distance between grandparents and their offspring. This may prevent some grandparents from being involved in the lives of their grandchildren to the extent they may have wanted to.

2.2 Grandparenthood, Well-Being and Health

Some previous research suggests that when grandparenthood leads to increased social contact, more activities and the adoption of additional roles, it may improve health and well-being. According to role enhancement theory, taking on additional roles can be beneficial for a person's well-being (Sieber, 1974). The additional role of grandparenthood may make life more fulfilling and this in turn may lead to better health (Ku et al., 2012). Indeed, the grandparent role has been documented to be considered one of the most satisfying parts of older age (e.g., Mahne & Motel-Klingebiel, 2012). Grandparenthood can provide a new life purpose, potentially reducing health problems such as depression symptoms and improving for example cognitive abilities or physical strength, while leading to a better self-perceived quality of life.

Social interactions are known to positively affect measures of quality of life and self-assessed health (Petrou / Kupek, 2008). If grandparenthood leads to increased social interactions with the younger generations, this could lead to stronger intergenerational ties and emotional closeness, which is especially beneficial for subjective well-being and mental health. Moreover, cognitive decline may be delayed by completing cognitively stimulating activities. Spending time with grandchildren may include reading books, playing games and other activities that are more cognitively stimulating than the sedentary activities some older individuals may otherwise do at home. In a similar way, physical health is positively affected if grandparents become more physically active by playing or strolling with grandchildren. The extent to which grandparenthood leads to a new role in life and to beneficial social interactions likely depends on whether there is close contact between the generations to begin with, and whether the grandparent regularly takes care of their grandchild. It is moreover thinkable that males and females differ in the ways they perceive their new roles.

There are also reasons why grandparenthood can have negative effects on well-being and health. Individuals may be overwhelmed by the new role they have to take on ("role strain", (Goode, 1960)). The increased demands on personal resources, such as time or money, can cause stress and strain, leading to worse well-being and health. This might particularly affect those who have to take over very much responsibility for child care. Furthermore, the time grandparents spend with their family can lead grandparents to give up hobbies such as sports, which in turn could lead to a decrease in physical activity and therefore worse health outcomes. Moreover, entering grandparenthood could raise the awareness of "being old", leading to elevated depression symptoms or worse well-being. For some, grandparenthood confronts them with their health issues, so that for the same objective health, people may feel that they have worse health. If grandparents have poor relations with their own children, becoming a grandparent may be confrontational to them, for example, if this leads them to be unable to have the amount of contact with their grandchildren that they would have wished for. Finally, grandparenthood may lead to conflict with their children(-in-law), if there are differences in opinion on how to raise the youngest generation, or on the amount of contact that grandparents and grandchildren should have. This can affect both well-being and health. In case an older adult did not welcome the fact that their own child became a parent (for example, teenage pregnancy or unexpected pregnancy), the potential for adverse well-being effects may be particularly large.

Following the discussion above, the most relevant variable behind the well-being and health effects of grandparenthood is family closeness. This refers to first, the intensity and quality of contact between the older and the middle generation before becoming a grandparent, second, the changes in closeness as a result of becoming a grandparent, and third, whether grandparents take care of their grandchildren. For older individuals who are less close to their own children, becoming a grandparent may be more of a negative experience compared to those with closer family relations. At the same time, family relations may become closer as a result of the family expansion. And finally, providing child care may be a positive experience that provides someone with an enjoyable new role in life and potentially increases in physical and cognitively activities. Though child care can also lead to role strain if too much of a responsibility is taken over. All of this may differ between males and females, as they may perceive different roles, expectations and responsibilities for themselves in grandparenthood. Also, there may be differences between becoming a grandparent through one's son or through one's daughter.

Lastly, a potential indirect effect from becoming a grandparent may result from grandparents reducing their labor supply because of becoming a grandparent or speeding up the decision to retire. Previous literature has shown that retirement may positively affect health, though evidence

is mixed, and there may be important heterogeneities (such as by gender and occupational groups) (cf. Nishimura et al., 2018; Mazzona & Peracchi, 2017).

2.3 Literature Review

Effects of grandparenthood have received comparatively little attention in research beyond a few mostly correlational studies. This research topic touches upon a strand of research with a much longer history: the health and labor market effects of parenthood, and especially motherhood. It has been established that becoming a mother leads to reduced labor supply and hourly earnings, an increased likelihood to receive welfare benefits and to worse health outcomes (Lundborg et al., 2017; Angrist & Evans, 1998). It has also been documented that grandparent involvement in care provision increases the labor supply of young mothers (García-Morán & Kuehn, 2017; Arpino & Bordone, 2014; Dimova & Wolff, 2011; Cardia & Ng, 2003).

It is less clear however, if and how children affect the grandparent generation, even though many grandparents play a big role in the lives of their grandchildren (Brunello & Rocco, 2019; Rupert & Zanella, 2018). Researchers only recently considered the labor market effects on grandparents themselves. There is now evidence that the transition into grandparenthood leads grandparents, especially grandmothers, to decrease their labor supply or to leave the labor market completely (Backhaus & Barslund, 2021; Rupert & Zanella, 2018; Frimmel et al., 2021), offsetting aims to prolong labor force attachment among older adults. Extensions of formal child care systems, on the other hand, may increase grandparental, and especially grandmaternal employment, as families substitute from informal care to formal care (Havnes & Mogstad, 2011).

Previous literature investigating the health effects of grandparenthood can be divided into research on the effects of taking care of grandchildren (defined as being with the grandchild without the presence of the parents), and research on the effects of becoming a grandparent per se. While there is little research on the latter, several studies have investigated the former. This literature is made up of two strands: one looking at the effects of custodial care arrangements, in which grandparents take over the complete responsibility for a grandchild, and the other looking at the effects of supplementary care. The first strand mainly uses US data, where relatively high rates of teenage pregnancy, substance abuse and incarceration force some grandparents to take on custodial responsibility of their grandchildren. This type of care is correlated with worse health outcomes (Baker & Silverstein, 2008; Blustein et al., 2004). The second strand of literature, on the effect of non-custodial care, has not provided a clear picture of the direction of the effect. Arpino & Bordone (2014) use an instrumental variables approach and find that providing supplementary care may improve the health of grandparents. The interpretation of their results is complicated

however, because their instrument (whether someone has grandchildren) may directly affect health. Ku et al. (2012) find a similar result for Taiwan using an individual fixed effects approach. Brunello & Rocco (2019), on the other hand, find that care-giving increases depression rates, though the possibility cannot be excluded that their instrument (time between two interviews) might affect the outcome through its effects on aging or grandchild's age.

A few mostly correlational studies investigated the health and well-being effects of becoming a grandparent per se. There is some evidence showing a positive association between becoming a grandparent and well-being for women, but not for men (Arpino et al., 2018; Di Gessa et al., 2019; Powdthavee, 2011). While Di Gessa et al. (2019) found no additional improvement in life satisfaction for subsequent grandchildren, Arpino et al. (2018) show that life satisfaction is positively correlated with someone's number of grandchildren. Christiansen (2014) explored the relationship between grandparenthood and mortality and found that grandparenthood is associated with a higher mortality risk for men, especially for those who become grandfathers at a young age. For women, becoming a grandmother at the age of 50 or older is associated with lower mortality, while becoming a grandmother before the age of 50 is associated with a higher mortality. These studies were of a correlational nature and can therefore not identify the causal effect of grandparenthood on well-being and health.

3 Data and Methodology

3.1 Data

In order to identify the effects of grandparenthood on well-being and health, we use data from Waves 1, 2, 4, 5 and 6 of the Survey of Health, Ageing and Retirement in Europe (SHARE). SHARE is a multidisciplinary, cross-national, individual-level panel study on health, well-being, socio-economic status as well as social and family networks of the population aged 50+ in several European countries (Börsch-Supan et al., 2013). The third wave, SHARELIFE, is a retrospective survey asking individuals about their life histories. It does not contain information on important variables necessary for our research question and is therefore excluded. The seventh wave also focused on retrospective questions among those participants who had not participated in Wave 3. Individuals who had participated in Wave 3 were asked the regular SHARE questionnaire. As this was the case only for a small subset of individuals (less than 30%), we decided against including Wave 7 in our analyses. We use data from all countries who have participated continuously in SHARE since Wave 1, which include Austria, Belgium, Denmark, France, Germany, Italy, The

Netherlands[2], Spain, Sweden and Switzerland. We restrict our sample to individuals between age 50 and 80. Individuals below 50 are excluded, as SHARE is representative for persons aged 50+. Those above 80 are excluded, since selective mortality becomes a greater issue. Furthermore, we only include individuals who are observed at least twice, have at least one child and who do not report having one or more grandchildren during the first wave they participate in SHARE.[3] Since we are interested in the effect of the transition into grandparenthood and whether the effect of grandparenthood changes with time, those who are already grandparents in their first wave would serve as imperfect controls, as we cannot identify when they transitioned into grandparenthood. Our final dataset is comprised of 14 810 individuals, resulting in 42 979 observations. A third of the individuals (4 771 individuals) transition into grandparenthood during the observation time.

3.1.1 Definition of Grandparenthood

Grandparenthood is determined using SHARE's children module. During each wave, the family respondent, which is randomly chosen if a person has a partner, answers the questions about children and grandchildren. The family respondent is first asked to count the total number of grandchildren, including those of a spouse or partner from a previous relationship. The family respondent is further asked to report the number of children per "own" child (i.e., how many children does the first/second/third/… child have), along with the birth year of the youngest child per child. Not all individuals answer the more detailed questions. As a result, we cannot always identify what exact year and through which child an individual became a grandparent for the first time, but we do know between which waves someone became a grandparent.[4] We use the combination of these variables to identify whether or not a person is a grandparent in any given wave. We transfer this information to the partner, if applicable.

3.1.2 Outcome Variables

Our outcome variables cover the domains of well-being, subjective overall estimates of own health, mental and cognitive health, physical health, as well as mortality. Our first outcome variable is self-assessed health, which is measured using a 5-point scale (excellent, very good, good, fair, poor). As is standard in the literature, we dichotomize this variable to create an indicator that is equal to 1 if a person reports either very good or excellent health. Well-being is measured using the CASP-12

[2] The Netherlands did not participate in the regular SHARE questionnaire in Wave 6. Instead it conducted a mixed mode experiment. We include Netherlands Wave 6 data in all analyses except when using maximum grip strength (not measured) and total words recalled (measured differently) as outcome variables.

[3] We exclude 191 individuals for whom information on grandchildren was not consistent and another 140 individuals who did not report any information on the number of grandchildren.

[4] We cannot determine which child is the parent of the grandchild in 63% of the grandparent transitions.

scale (Wiggins et al., 2008). The CASP scale measures self-assessed quality of life and is composed of four subscales covering questions about **c**ontrol, **a**utonomy, **s**elf-realization and **p**leasure. Each of the 12 items is presented as a question or statement which is assessed on a 4-point scale (often (4), sometimes (3), rarely (2), never (1)). The score ranges from a minimum of 12 to a maximum of 48.

Mental health is measured using the EURO-D geriatric depression scale. Persons who report four or more of the twelve symptoms measured on this scale are categorized as having a high likelihood of suffering from a clinically relevant depression (Prince et al., 1999).[5] Cognitive health is captured using a word recall test, in which respondents are read a list of 10 words and asked to repeat them immediately and with a small delay. Both word recalls are summed up, giving a maximum total score of 20.

Physical health is captured using three variables. The first is whether the respondent reported any limitations to (instrumental) activities of daily living ((I)ADL).[6] Second, grip strength (0-100 kg) is measured using a dynamometer (Smedley, S Dynamometer, TTM, Tokyo, 100 kg). Respondents are instructed to hold their elbow at a 90° angle with the upper arms pressed to their body, in a standing (or sitting) position. Respondents are then asked to squeeze as hard as possible - twice with each hand. The maximum grip force is recorded - which can reach values up to 100 kg. It has been shown that it is a good, independent predictor of mortality (Leong et al., 2015; Ambrasat et al., 2011). The final variable is mortality. When a person cannot be interviewed in a wave, SHARE attempts to identify whether that person has passed away. The last time we observe a deceased person's grandparenthood status is in the wave before they die. Thus, we create a dummy variable "deceased by next wave", which is equal to 1 if the individual is recorded as deceased in the following wave.

3.2 Methodology

The key obstacle in identifying the relationship between grandparenthood and health is the potential endogeneity of grandparenthood. Fertility preferences may be transmitted from parents to children, so that the fertility decisions of the middle generation (the parents) depend on fertility

[5] Variables forming the EURO-D scale: depression, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment, tearfulness.

[6] ADL: dressing, including putting on shoes and socks; walking across a room; bathing or showering; eating, such as cutting up your food; getting in and out of bed; using the toilet, including getting up or down. IADL: using a map to figure out how to get around in a strange place; preparing a hot meal; shopping for groceries; making telephone calls; taking medications; doing work around the house or garden; managing money, such as paying bills and keeping track of expenses. These two variables are combined into one variable equal to 1, if a person reports at least one ADL or IADL.

decisions of the older generation (the grandparents). Becoming a grandparent also depends on several factors such as current age, age at birth of one's own first child, number of children, education, etc. While several of these latter factors can be controlled for in a multiple regression set-up, variables such as preferences, beliefs and values that are transferred from the (potential) grandparents to their children cannot be captured by the available data. Therefore, we will use a fixed effects approach. Using individual level fixed effects allows us to estimate a model that considers within-subject variance, instead of comparing individuals with grandchildren to those without. This latter comparison would be problematic, as those who remain grandchild-less are likely systematically different from those who do become grandparents.

We identify the effect of grandparenthood through the within-person variation in the grandparent-status by estimating the following equation:

$$Y_{it} = \beta_1 * Grandparent_{it} + X_{it}'\gamma + \tau_t + \mu_i + u_{it} \quad (1)$$

where Y_{it} measures the health or well-being of individual i in wave t, $Grandparent_{it}$ is an indicator variable equal to 1 if an individual i has at least one grandchild in wave t, X_{it} is a set of control variables, τ_t are wave fixed effects, μ_i are individual level fixed effects, and u_{it} is the error term. Since we are using a fixed effects approach, time-invariant covariates such as gender, country, or educational level do not need to be controlled for. Instead, we control for age by including a linear and a quadratic age term. We also estimate our regressions separately for females and males, as there may be gender differences in the way grandparenthood affects well-being and health.

The identifying assumption in our fixed effects approach is that the probability of becoming a grandparent is independent of changes in well-being and particularly health. A potential concern is not that the health *level* of the potential grandparent generation affects the fertility decisions of the middle generation, as our fixed effects approach neutralizes that issue.[7] The concern is that *changes* in the health status of older adults affect their children's fertility decisions. For example, our identifying assumption would be violated if the middle generation adapted their fertility behavior to the changes in the health path of their parents(-in-law), by postponing having children after a parent(-in-law) experiences a negative health shock. Rupert & Zanella (2018) recognized a similar potential for endogeneity in their study on the effect of grandparenthood on grandparental

[7] If the poor health of an older adult leads his/her children to altogether abandon having children themselves, then such an older person does not contribute to our identification in the individual fixed effects model. Our estimates only provide information on how the health of older individuals who do become grandparents during the period under observation, changes as a result of grandparenthood. That is: we estimate the average treatment effect on the treated, which is arguably also the effect that is of primary interest.

labor supply. They argue that the labor force attachment of grandparents may influence the fertility decision of the (potential) parents. Having parents that are already out of the labor force reduces the cost of having a child, as support by the grandparents is more readily available. Their solution was to use the gender of the first child to instrument the transition into grandparenthood, exploiting that, on average, daughters marry and have children at a younger age. While it may be reasonable to assume that the gender of the first child is not related to labor market outcomes, exogeneity is less likely to hold for our situation. Having a first child who is a girl may influence the well-being and health path of a (potential) grandparent, due to the different nature of relationships to sons and daughters and their different roles within the family. If the eldest child is a daughter, she may have been more involved in taking care of younger siblings, therefore reducing the stress among the older generation, leading to better health and well-being. Other instruments that have been suggested, including the number of children or the marital status of children (Ku et al., 2012), may fulfill the relevance criteria of an instrument, but are not exogenous to the well-being and health path of the (potential) grandparent.

As an instrumental variable strategy hence does not seem to be a viable alternative approach, we will use several strategies to demonstrate that the fixed effects approach leads to valid results. To our knowledge, there is no evidence of health shocks to parents(-in-law) influencing their children's fertility decisions. Furthermore, there is limited possibility to adjust fertility decisions to health shocks, due to the biological limitations to the time a woman can bear children and the fact that the timing of fertility cannot be planned exactly (see also Frimmel et al. (2021)). Nonetheless, we will vigorously test this assumption to show that there is no evidence that the probability to become a grandparent at a certain moment in time is affected by previous health changes. We will also rigorously test the robustness of our specification and other assumptions.

4 Results

4.1 The Average Well-Being and Health Effects of Becoming a Grandparent

We provide descriptive statistics in Table 1, while Table 2 shows the results from the first set of analyses. We see that becoming a grandparent has a somewhat negative effect on self-perceived quality of life for both males and females. Self-assessed health gets worse as well, though this only becomes significant for females, who become 2.8 percentage point less likely to report being in a very good or excellent health. On the other hand, the probability to have at least one (I)ADL limitation decreases by a bit more than one percentage point upon becoming a grandparent; an effect which seems concentrated among females. And the other point estimates for females in all cases point to health improvements, too.

4.2 The Immediate and Delayed Effects of Becoming a Grandparent

In addition to our main analyses following equation (1), we also estimate regressions that consider the time since the transition. That is: the effect of becoming a grandparent may not be immediate or may wear out or increase over time. It must be noted that time since becoming a grandparent cannot be separated from the age of the oldest grandchild. We do not know exactly when grandchildren are born, but we are able to determine between which waves grandchildren were born since SHARE takes place in regular time intervals of 27-28 months. Appendix A details how we assign the time variable to individuals given some limitations of the SHARE data in this respect.

In our timing analyses, we use three categories for the grandparent transition variable: becoming a grandparent since the last wave (between $t-1$ and t), which corresponds to the oldest grandchild being between 0 and about 2 years of age; becoming a grandparent between waves $t-3$ and $t-1$, which corresponds to the oldest grandchild being between about 2 and 6 years old; and becoming a grandparent between waves $t-5$ and $t-3$, which corresponds to the oldest grandchild being between about 6 and 10 years old. (We do not observe an individual more than 10 years after first reporting to be a grandparent). One advantage of these timing categories is that they roughly correspond to three life phases of children. The very young children (≈0-2 years old) in our first category ($t-1$ & t) require more intensive care-taking, while older children (≈6-10 years old) in the third category ($t-5$ & $t-3$) are required to be in formal schooling in most countries, leading to a different type of interaction. Since the type of interaction between grandparents and grandchildren changes with the age of the grandchild, the well-being and health effects may change over time.

Table 3 presents the results by the time since the transition into grandparenthood. There does not appear to be a clear pattern in the development of effects over time. However, it is important to note that the main effects described above are not limited to immediate, short-run effects. Particularly, the most pronounced effects among females, a reduced quality of life and self-assessed health, appear sustained.

4.3 The Effects of the Number of Grandchildren on Health

We furthermore investigate the intensive margin. The effect of the number of grandchildren may be nonlinear: one might particularly expect diminishing returns from some number of grandchildren on. Therefore, we include three dummy variables in our regressions that measure whether an individual has one grandchild, two grandchildren, or three or more grandchildren, respectively, when observed in wave t. Of course, the effects of time since becoming a grandparent and number of grandchildren cannot be fully separated.

When considering the effect of the number of grandchildren (see Table 4), we again see that becoming a grandparent primarily has negative effects on the well-being and self-assessed health of females. These effects get stronger once a grandmother has two or more grandchildren. The pattern of point estimates mostly suggesting health improvements on the other variables for females remains.

4.4 Robustness Checks

To check the robustness of our results, we run five different types of checks.[8] First, difference-in-differences in a two-way fixed effects setup with staggered treatment implementation does not necessarily give the average effect of the treatment on the treated (ATT) (Goodman-Bacon, 2021). Deviations occur if there is effect heterogeneity between groups, while simultaneously the moment the treatment starts varies between these groups. For example, those types of individuals for whom the treatment effect is largest tend to be treated the earliest. Or the treatment effect in general increases from year to year. In our analyses, the moment the treatment starts of course varies between individuals. But it is unlikely that the treatment effect varies considerably between people who became a grandparent at different time points. That is: we have a panel of people with different ages at time point $t = 0$, plus at later time points, new additional respondents are added to the SHARE survey. To ensure that the ATT is not biased by the two-way fixed effects difference-in-differences with staggered treatment implementation, we calculate the main results using the two-stage difference-in-differences algorithm by Gardner (2021). The first stage in this approach consists of identifying the wave and individual fixed effects utilizing the sample of untreated observations. In the second stage, the outcome variable is adjusted for these fixed effects, after which it is regressed on treatment status. The results are robust (Appendix Table B-1). A significant decrease in mortality probability now appears for both females and males, while the effect on quality of life for both sexes increases in size.

Second, we check the robustness of the age specification by using a linear and cubic age trend. Since both health and grandparenthood change with age, it is important to correctly specify age in our model. Our results are not sensitive to alternative functional forms of age (columns (3)-(6) of Table B-1).

Third, we want to rule out that selective mortality or selective attrition is biasing our results. We check the robustness of our results by using different sample restrictions – first reducing our sample

[8] Since previous results showed that effects are different for men and women, we will now provide results for men and women separately (the combined results are available upon request).

to individuals aged 50-65, in which selective mortality is less of an issue, and second by not including an age limit, thereby including all individuals aged 50 and above. Results are robust to both sample restrictions (Table B-1). A further worry could be that becoming a grandparent increases the chance to drop out of the survey, which would lead to non-random attrition and therefore a potential source of bias. To check this channel, we create a variable to capture if an individual is observed in the next wave and use that as an outcome variable. Becoming a grandparent does not influence the likelihood to be observed in the next wave (Table B-2), further supporting that our results are not biased by selective mortality or non-random attrition.

In our fourth robustness check, we investigate whether our results are driven by any one particular country. If this were the case, our results would not be robust to different settings. We exclude one country at a time and find that results are robust to leaving out any one country (Table B-3).

Our final set of robustness checks tests the possibility that the fixed effects approach does not sufficiently control for endogeneity of grandparenthood due to the presence of time-varying variables. The main concern is that a negative development in the health of someone's own parent may lead a person to delay having children, because of the (expected) increased demand for care of the elderly parent, or because of increased stress. The opposite may also occur: the middle generation can for example decide to have children earlier knowing that their parents suffer from a life-threatening disease, so that their parents will have a chance to meet their grandchildren before passing away. To check whether this occurs, we run a regression of a dummy variable indicating whether someone became a grandparent between t and $t+1$ on a dummy variable indicating a negative health change between waves $t-1$ and t. We run this regression separately for each outcome. Since this requires data from three *consecutive* waves, we can only use individuals observed in Waves 4, 5 and 6 and are therefore restricted to using one data point for each individual. We hence cannot include individual fixed effects in this analysis. We supplement the Wave 5 dataset with indicator variables for having experienced worsening health or well-being between Waves 4 and 5 and for whether an individual reports being a grandparent for the first time in Wave 6. We then regress the latter on the former plus a set of covariates from Wave 5 (age, age squared, gender, years of education, country of residence, being in a relationship, number of children and sex composition of children). We find that a health or well-being change does not affect the probability to become a grandparent, which validates our fixed effects approach – see Table B-4.

We only observe in which wave someone first reported being a grandparent, but do not know the exact date at which this happened. The issue therefore is not only the one dealt with above, namely

that experiencing a health change between $t-1$ & t might affect the likelihood to become a grandparent between t & $t+1$. Additionally, if a respondent first reports being a grandparent in wave t, we do not know whether any observed health changes in wave t are a result of having become a grandparent, or whether they preceded this. While this reversed causality is unlikely to occur given our Table B-4 results, we conduct one further check on this. We exclude individuals who report having experienced a severe health shock (heart attack, cancer, stroke) in waves prior to first reporting to have grandchildren (12.3% of men and 8.9% of women). The idea behind this restriction is that older individuals who suffered from a major health condition may be expected to follow a stronger and more predictable downward health path by their offspring, and that the offspring could react by adjusting fertility behavior.

Note that we only have information on whether individuals ever had a major health condition, but that we cannot reliably know at what time-point this condition occurred. This means that we cannot use these conditions as dependent variables in our main analyses. [9]

As Appendix Table B-5 shows, excluding individuals who report these health conditions prior to grandparenthood does not affect our estimates. We run a further check in which we additionally exclude individuals who report a major health condition in the same wave as the grandparenthood transition. We now lose 15.9% of men and 10.6% of women. The results remain unchanged (see columns (3) and (4) of Table B-5). We also ran analyses in which we only excluded the latter group and in which we exclude all people who at some point reported having been diagnosed with one of the three major health conditions – also after becoming grandparents - and the results remain the same.[10]

We further conduct a placebo test, which checks whether health in t is affected by becoming a grandparent between t and $t+1$ (Table B-6). If this were the case, it would support health changes preceding instead of following grandparenthood. However, there is no effect on health of becoming a grandparent in the next wave, which therefore supports the above conclusion that the health effects do not precede the grandparent transition.

[9] SHARE asks about ever having experienced a certain condition. Some people report having experienced a condition in one wave, but not in following waves. This is consistent with previous research that showed that people's survey responses regarding whether they had ever been diagnosed with specific health conditions do not always match with clinical evidence. Additionally, under-reporting of such conditions occurs (Robinson et al., 1997). Thus, we interpret the information in SHARE as individual-level prevalence of major health conditions, but not as incidences that can be assigned to a specific time-point.

[10] Results available upon request.

In addition to health changes potentially affecting fertility decisions of the middle generation and health of the older generation, further time varying factors could influence both of these factors. One variable that is potentially closely correlated with the beginning of grandparenthood, which may have separate effects on the health and well-being of the grandparents, is the marital status of the children. If the middle generation gets married and has a child between $t-1$ and t, it may be that the effect in the older generation is also driven by the former and not only the latter. To check for this, we include an indicator that captures if older individuals have at least one child who is married or in a registered relationship. As explained previously, it is not possible to identify which child is the parent of the grandchild, due to missing data, and hence the marital status of all children is considered. The pattern of results remains unchanged to the inclusion of this time varying covariate (Table B-7).

Another potentially problematic time-varying variable is retirement.[11] This may lead to omitted variable bias if entering retirement increases the likelihood to become a grandparent and at the same time affects health. The worry is that prospective parents may delay childbearing until their own parents have retired, so that the grandparents can help take care of the child. The amount of bias this may cause should not be overstated. There is mixed evidence for the existence and direction of health effects of retirement (cf. Mazzona & Peracchi, 2017), while the share of all pregnancies that are delayed until a parent retires is likely small. Moreover, if an older person retires in response to becoming a grandparent, rather than the other way around, this is actually a mechanism through which grandparenthood may affect well-being and health (which we will consider below). We investigate whether there is a relationship between retiring between waves $t-2$ and $t-1$ and becoming a grandparent between waves $t-1$ and t, as well as between retiring between $t-1$ and t and becoming a grandparent between waves $t-1$ and t.[12] Appendix Table B-8 shows that men have a tendency to retire shortly before becoming a grandfather. For females, for whom we found the largest effects of grandparenthood, we find no such relation. The results further show that retiring and becoming a grandparent during the same time span is likely for both sexes. In this case, we cannot determine which event occurred first – retirement or the birth of the grandchild.

To ensure that retirement is not the true driver of the observed well-being and health effects, we conduct two additional checks. First, we include retirement as a further control variable. This takes out the potential bias of simultaneous retirement. But it also takes out a potential channel through

[11] Note that all analyses including retirement exclude homemakers.
[12] Due to data availability, this check can only be run for individuals observed in Waves 4, 5 and 6.

which grandparenthood may affect health in the sense that the effect of grandparenthood on well-being and health may in part be driven by those who retire as a response to becoming a grandparent. Either way, the pattern of the effect of grandparenthood on well-being and health remains unchanged – see columns (3) and (4) in Appendix Table B-7. We also run a robustness check where we exclude the 621 individuals who report entering retirement and grandparenthood in the same wave. Results are robust to this sample restriction – columns (5) and (6) in Table B-7.

Overall, we can conclude that our main results are robust to all five sets of robustness checks.

5 Heterogeneity and channels

After having shown the robustness of our main results, we now turn to potential explanations and channels for our results. We are not able to investigate every potential pathway, but we are able to investigate several potentially important ones. One potential channel we have already observed above: an (impending) grandparenthood prompts older individuals, especially males, to retire. As discussed above however, retirement does not seem to drive the reported effects.

We continue investigating pathways by conducting heterogeneity analyses in which effects are compared between individuals who differ along relevant dimensions, and by taking behavioral variables as dependent variables. When investigating effect heterogeneity, we make the observation that the pattern of results for self-assessed general health, which is an a-specific measure, strongly follows that for self-assessed quality of life, while other health measures follow a different pattern. This suggests that the effects on self-assessed health should not be interpreted as pure health effects, but likely reflect a general change in well-being, as a worsening well-being leads people to re-evaluate their health.

The main dimension we consider is family closeness which is as discussed a central aspect of grandparenthood. Closeness refers both to how close someone is to their family prior to becoming a grandparent, and to changes in family closeness after having become a grandparent. The latter includes care taking of grandchildren. Table 5 shows results from models that include an interaction term between the grouping dimension and the grandparent indicator. We utilize four different measures to capture aspects of family closeness. First, we investigate whether the effect of grandparenthood is different among individuals who did vs did not have close contact with their children prior to having grandchildren. As stated previously, we cannot determine the amount of contact with the relevant child, i.e., the child who is the parent of the grandchild, due to missing data. Instead, to categorize the grandparents, we consider the amount of contact they had with their oldest child before becoming a grandparent. We do the same for contact with the youngest

child.[13] Contact with "any" child would be endogenous, in the sense that individuals with many children are more likely to have close contact with at least one child and are also more likely to become a grandparent. We only use information on the amount of contact before someone became a grandparent, as grandparenthood may affect the degree of contact. Hence, later measures of contact may be endogenous. We therefore classify people based on the amount of contact they reported in the first wave they answered this question.[14] We consider being in contact daily or several times a week as close contact, and being in contact about once a week or less often as less close contact. 67% and 73% of grandparents had close contact with their oldest and youngest child, respectively. The advantage of focusing on the oldest child is that the likelihood is highest that someone became a grandparent through this child. On the other hand, the intensity of this relation may be endogenous if it already changes some time before the middle generation becomes a parent themselves as a result of family planning, marrying, moving and the like. This is why we additionally focus on contact with the youngest child.

We find that the negative effects of grandparenthood on self-assessed health and quality of life are concentrated among individuals who had less contact with their children prior to grandparenthood – see Table 5. In contrast, several beneficial effects on health variables occur among individuals who did have close contact to their children. This includes effects on cognitive health, depressive symptoms and limitations to (instrumental) activities of daily living.

Our second measure of heterogeneity by degree of family cohesion classifies grandparents based on whether they were involved in the provision of care for a grandchild. Though this is a direct measure of the extent to which grandparents have contact to the relevant parts of their family, we realize that this classification suffers from potential endogeneities. A negative development in health reduces the probability that someone will take care of a grandchild. We attempt to minimize this issue by considering the effect based on whether someone *ever* took care of a grandchild, i.e., during any of the waves during which the person was observed (provision of care is defined as providing care without the parents being present). We lose some observations (23% of all

[13] SHARE only records the amount of contact for the first four children. This analysis splits the effect by the amount of contact with the youngest reported child. Out of individuals who transition into grandparenthood, less than 2% report having more than four children, while 17% report having only one child. For the former group, the contact with the "youngest" child may not be the actual youngest child, while for the latter group, the contact for the oldest and youngest child is based on the same child.

[14] Due to the structure of SHARE, only one partner answered questions about this topic per wave. As we cannot assume that the amount of contact is the same for both partners, and as not all older individuals ever answered this question, we lose some information (about 36% of the individuals who transitioned into grandparenthood do not answer these questions prior to grandparenthood). If someone only answered the contact question for the first time after becoming a grandparent, we exclude this person from the analysis, as the amount of contact may be endogenously affected by becoming a grandparent.

grandparents) as not all grandparents answer the questions about care provision. 23% of grandmothers never took care a grandchild, 11% ever took daily care of a grandchild and 65% did provide child care to a grandchild, but never did so daily. For grandfathers, these numbers are 31%, 9% and 60%, respectively. For quality of life and self-assessed health, the negative effects are concentrated among those who never took care of a grandchild. These adverse effects do not appear among grandparents who regularly, but not daily, provide child care to grandchildren. This group moreover exhibits some beneficial health effects. This all fits with the pattern for closeness of contact in the Table 5 rows above this. Interestingly, providing daily care is associated with a worse well-being and self-assessed health among females, but with improvements on both measures among males.

Our third measure of heterogeneity by degree of family cohesion classifies individuals based on the distance their oldest child lived away in the first interview. Since the birth of a child could prompt the middle generation to move closer to one set of grandparents, the first observation is used to minimize endogeneity concerns. The distance to the oldest child was split into three categories: living maximally 5 kilometers away, living 5-100 km away and living 100 or more km away. The pattern of results is not very clear. Perhaps the distance variable is only a poor proxy for closeness of contact and actual care-taking if these are the variables that really matter.

Prior family closeness may on the one hand determine how someone experiences becoming a grandparent; on the other hand, family closeness may also change as a result of becoming a grandparent and function as a channel in this way. Table 6 shows results of a regression with a dummy for contemporaneously having close contact with any child as the dependent variable. Becoming a grandparent increases the probability of being in close contact by about three percentage points.

The next potential source of channels that we consider is activity. Becoming a grandparent may affect the extent to which older individuals remain or become physically and cognitively active. Table 6 shows that there is no effect of grandparenthood on being moderately physically active at least once a week (base rate: 88%). However, grandparenthood does reduce the likelihood to conduct vigorous physical activity at least weekly by around three percentage points against a base rate of 59%. This might be due to a crowding out of such activities by visits to or from the family, or by child care. We do not have direct measures of cognitive activity, but Table 5 shows that cognitive performance goes up, especially among those providing child care. This suggests that there are groups of older individuals for whom grandchildren cause a higher degree of cognitive activation.

Grandparenthood may be perceived as a burden by older individuals, which is underlined by the negative effects on well-being (quality of life). We already saw that particularly older females who daily took care of grandchildren displayed decreased quality of life and self-assessed health which is consistent with grandparenthood being burdensome for this group. Another group of older individuals for whom grandparenthood is particularly likely to be perceived as a burden is those whose grandchildren are unwanted or unplanned by the middle generation. We run analyses in which three groups are excluded: first, grandparents who report (own) children living in their household in the wave of their grandparent transition. Second, all observations with children under the age of 20, as there is a potential that the grandchild was born as a result of a teenage pregnancy. Third, grandparents who, in the wave of becoming grandparents, do not have any child who reports being married or in a registered relationship. Neither when we exclude one group at a time, nor when we exclude all three groups simultaneously do our main results change in any meaningful way. Each of the groups separately is relatively small, so that are unable to analyze results for each of the respective groups separately. Moreover, we often do not know through which child someone became a grandparent, so that we cannot pinpoint which observation for example concerns a teenage pregnancy. The takeaway from this analysis is that the main results are not driven by grandparents that were confronted with grandchildren who were unwanted or unplanned by the middle generation.

Finally, we investigate one more potential heterogeneity. Anecdotal and academic evidence (Tanskanen et al., 2014) suggest that the relationship between grandparents and grandchildren depends on the lineage, i.e., whether the grandchild is the child of a son or a daughter, with greatest involvement and the most intense relationship occurring between a grandmother and the grandchildren of a daughter. Additionally, becoming a grandparent may differentially affect the relation with one's daughter's versus one's son's family. For some individuals, SHARE provides information on whether the transition occurred through a son or a daughter. Additionally, if someone only had only sons or only daughters, we know about the lineage, too. Utilizing this information, Table 7 presents the effects of grandparenthood by whether the transition occurred through a son or daughter. We find no clear pattern.

6 Discussion and Conclusion

Using data on ten European countries from Waves 1, 2, 4, 5 and 6 of the Survey of Health, Ageing and Retirement in Europe, we use an individual level fixed effects approach to investigate the effect of transitioning into grandparenthood on the health and well-being of older individuals. Unlike previous correlational evidence and the widespread view that the grandparent role is joyous and a

positive life event, we find that quality of life decreases as a person transitions into grandparenthood. For females, subjective overall estimates of own health decline as well. These results do not change with the time since having become a grandparent / the age of the oldest grandchild, nor do they change along the intensive margin of the number of grandchildren. In contrast, no clear pattern of effects is found for mental and cognitive health, physical health, and mortality. If anything, the pattern of results suggests that there might be slightly positive effects on these measures.

Our results thus show that grandparenthood on average is considered burdensome. This average effect is not large, though. For example, quality of life decreases by no more than about five percent of a standard deviation. Interestingly, the pattern of results for self-assessed health does not follow that for the other health variables, but rather that for quality of life. As self-assessed health is not specific for particular health dimensions or conditions, changes in self-assessed health may rather reflect general shifts in well-being.

When explaining the overall decrease in well-being, some heterogeneities in the effect need to be considered. The negative quality of life and self-assessed health effects are not driven by cases in which the family expansion was unwanted or unplanned for by the middle generation. Instead, closeness of family contact is a central variable that leads to five observations:

1. The decrease in well-being upon becoming a grandparent especially takes place among those who had less contact with their own children prior to grandparenthood. Among those who *did* already have close contact with their children, a number of positive health effects occur, such as decreases in symptoms that might indicate a depression, a better cognitive performance, and fewer limitations to (instrumental) activities of daily living.
2. After becoming a grandparent, the share of older individuals who are in close contact with their children increases. This may occur since they help out taking care of grandchildren.
3. Among older individuals who never take care of their grandchildren, well-being on average decreases upon becoming a grandparent.
4. Grandparents who regularly, but not daily, take care of grandchildren, do not experience a drop in well-being while a few beneficial health effects are observed.
5. For those taking care of grandchildren daily, the pattern differs between females and males: among females well-being decreases. This suggests that daily care-taking is too burdensome for many grandmothers. This echoes the results from previous research on grandparents taking over custodial care of their grandchildren (Baker & Silverstein, 2008; Blustein et al., 2004). In contrast, for grandfathers daily taking care of grandchildren, well-

being may even improve. We speculate that they on average may feel less of a burden of responsibility in these cases.

Apart from the extreme case of daily caring for grandchildren, thus, close family contact and care-taking can make becoming a grandparent a more positive experience which leads to some health improvements and no decrease in well-being. Individuals with closer family contact are likely to have a better relationship with their own children, and regularly provide child care. This in turn could lead to the additional role of grandparenthood being perceived more positively, therefore leading to health improvements. Among those who had less contact, grandparenthood may raise the feelings of being old and frail which is reflected in a lower self-perceived quality of life and a poorer self-assessed health. Furthermore, it is possible that individuals with little contact prior to grandparenthood, are not able to fulfill the grandparent role as they may have liked, which could lead to being less satisfied with life. The birth of grandchildren may make them more keenly aware of the distant relationship with their children, again leading to a lower well-being.

We finally also investigated individuals' activity levels as a potential channel. Becoming a grandparent on average does not affect whether older individuals are at least moderately physically active once per week or more, but it does decrease the share of individuals who conduct vigorous physical activity. Given the absent or slightly positive health effects of grandparenthood, physical activity is unlikely to play an important role regarding health effects. Perhaps a reduction in vigorous physical activity does contribute to the observed decrease in well-being. A different channel is changes in cognitive activity. A decline in cognitive capacity with age may be delayed if grandparenthood leads to an increase in mentally stimulating activities. While we do not observe the extent to which older individuals engage in such cognitive activities, we do find evidence that cognitive performance increases among those taking care of grandchildren. This suggests that grandchild care does lead to cognitive stimulation and a preservation of cognitive performance.

Regarding policy implications, we find no evidence to suggest that grandparents will suffer negative health consequences if they serve as substitutes or complements for formal care. In fact, we even see that grandparents who are involved in care provision experience some health improvements, especially in terms of cognitive ability and (I)ADL limitations. Involving grandparents in care provision or strengthening family cohesion through other policies may therefore fit to the active aging framework. But providing daily care may be too much for many grandmothers.

Another policy-relevant message arises regarding retirement. We find that many older individuals retire around the time of becoming a grandparent or shortly before. While retirement does not seem to drive the reported well-being and health effects, people's retirement behavior does

suggest something about their preferences. Abolishing early retirement schemes or increasing retirement ages may prevent older individuals from retiring when becoming a grandparent, and reduces their possibility for grandparental involvement. This may lead to a loss of utility and may mean that parents instead need to rely more strongly on formal child care. More flexible working arrangements and retirement schemes may ensure a longer labor force attachment among older adults, allowing them to be simultaneously involved in the lives of their children and grandchildren and working. These issues fall into the debate about on the one hand keeping retirement systems fundable, and on the other hand maximizing populations' utilities.

As the population continues to change with shifts in the age structure, accompanied by changes in the pension systems as well as fertility patterns, it is important to consider these systems as part of a whole and not as separate parts of society. As the population of older individuals continues to grow, it is necessary to better understand their health and quality of life trajectories, including the effects of big life events. Until now, only two major life events have received attention in the literature: retirement and negative health shocks to or loss of a spouse. A third potential major life event, becoming a grandparent received very little attention. This paper provides a number of first insights. More research on how grandparenthood and related policies affect the labor supply, health, and well-being of older individuals will be necessary to guide policy makers on how to best regard these dynamics in different policy environments.

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Are grandchildren good for you?

Well-Being and Health Effects of Becoming a Grandparent

Tables

Table 1: Descriptive Statistics

	All		Female		Male	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Characteristics						
Age	59.76	6.47	59.19	6.63	60.36	6.81
Number of Children	2.02	0.88	1.97	0.86	2.07	0.90
Living with Spouse/Partner	0.80		0.76		0.85	
Close contact oldest child pre-GP	0.65		0.67		0.62	
Close contact youngest child pre-GP	0.71		0.73		0.69	
Health Outcomes						
Very good to excellent general health	0.38		0.37		0.39	
CASP (quality of life)	39.03	5.66	38.79	5.82	39.28	5.48
Depressive symptoms	0.21		0.27		0.14	
Total words recalled	10.34	3.42	10.79	3.48	9.86	3.29
1 or more (I)ADL limitations	0.10		0.12		0.08	
Maximum grip strength	37.51	11.92	28.71	6.36	46.57	9.21
Deceased by next wave	0.005		0.004		0.007	
Observations	42,979		21,882		21,097	
(Number of Individuals)	(14,810)		(7,594)		(7,216)	

Note: Standard deviations are provided for continuous variables, while the average value is provided for both continuous and binary variables. The average value of having ever looked after a grandchild and having contact with the oldest (youngest) child is calculated only among individuals who transition into grandparenthood in our sampling period and who responded to the relevant questions. "pre-GP" refers to "before becoming a grandparent".

Table 2: The Effect of Becoming a Grandparent on Health

	All	Female	Male	All	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
	Very Good/ Excellent SAH			**Total Words Recalled**		
grandparent	-0.020**	-0.028***	-0.011	0.082	0.113	0.053
	(0.008)	(0.011)	(0.011)	(0.051)	(0.072)	(0.071)
N	42,917	21,854	21,063	41,601	21,242	20,359
	Quality of Life			**At least 1 (I)ADL Limitation**		
grandparent	-0.262***	-0.268**	-0.245**	-0.011**	-0.013*	-0.007
	(0.083)	(0.116)	(0.117)	(0.005)	(0.008)	(0.007)
N	39,998	20,409	19,589	42,912	21,853	21,059
	Depressive Symptoms			**Maximum Grip Strength**		
grandparent	-0.000	-0.002	0.002	0.022	0.027	0.003
	(0.007)	(0.011)	(0.009)	(0.103)	(0.122)	(0.167)
N	42,265	21,575	20,690	40,236	20,413	19,823
				Deceased in Next Wave		
grandparent				0.001	-0.001	0.003
				(0.001)	(0.002)	(0.003)
N				42,979	21,882	21,097

*Note: These are the results of fixed effect regressions that also control for age, age squared and wave dummies. Negative coefficients for very good/excellent health, quality of life, total words recalled and maximum grip strength indicate worse outcomes, while negative coefficients for depressive symptoms, at least 1 (I)ADL and deceased indicate more beneficial outcomes. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1*

Table 3: The Immediate and Delayed Effect of Becoming a Grandparent on Health

	All (1)	Female (2)	Male (3)	All (4)	Female (5)	Male (6)
	Very Good/ Excellent SAH			**Total Words Recalled**		
t-1 & t	-0.022**	-0.036***	-0.005	0.037	0.066	0.010
	(0.009)	(0.013)	(0.013)	(0.061)	(0.086)	(0.085)
t-3 & t-1	-0.017	-0.034**	0.003	0.092	0.106	0.089
	(0.011)	(0.015)	(0.016)	(0.073)	(0.104)	(0.104)
t-5 & t-3	-0.039*	-0.082***	0.005	-0.014	0.031	-0.054
	(0.020)	(0.028)	(0.028)	(0.137)	(0.206)	(0.181)
	Quality of Life			**At least 1 (I)ADL Limitation**		
t-1 & t	-0.231**	-0.269**	-0.183	-0.010	-0.009	-0.009
	(0.096)	(0.136)	(0.136)	(0.006)	(0.009)	(0.008)
t-3 & t-1	-0.357***	-0.505***	-0.194	-0.008	-0.020*	0.005
	(0.121)	(0.170)	(0.172)	(0.008)	(0.011)	(0.010)
t-5 & t-3	-0.152	-0.308	0.021	-0.002	0.001	-0.004
	(0.224)	(0.337)	(0.296)	(0.016)	(0.024)	(0.020)
	Depressive Symptoms			**Maximum Grip Strength**		
t-1 & t	-0.001	-0.008	0.008	-0.106	0.014	-0.233
	(0.008)	(0.012)	(0.010)	(0.122)	(0.147)	(0.196)
t-3 & t-1	0.000	0.002	-0.001	0.190	0.112	0.244
	(0.010)	(0.016)	(0.012)	(0.144)	(0.168)	(0.233)
t-5 & t-3	-0.011	0.001	-0.021	-0.095	0.281	-0.442
	(0.018)	(0.029)	(0.022)	(0.262)	(0.301)	(0.412)
				Deceased in Next Wave		
t-1 & t				0.001	-0.001	0.003
				(0.001)	(0.001)	(0.003)
t-3 & t-1				-0.003	-0.000	-0.007**
				(0.002)	(0.003)	(0.003)
t-5 & t-3				-0.001	-0.003	0.002
				(0.005)	(0.006)	(0.008)

Note: Sample size for columns (1) and (4) ranges between 37 000 and 40 000. The sample size by gender ranges between 18 000 and 20 000. These are the results of fixed effect regressions that also control for age, age squared and wave dummies. $t-1$ & t; $t-3$ & $t-1$ *and* $t-5$ & $t-3$ *refer to the timing (SHARE wave) of the grandparent transition and indicate the oldest grandchild being between about 0-2, 2-6 and 6-10 years of age, respectively. Negative coefficients for very good/excellent health, quality of life, total words recalled and maximum grip strength indicate worse outcomes, while negative coefficients for depressive symptoms, at least 1 (I)ADL and deceased indicate more beneficial outcomes. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*

Table 4: The Effect of Number of Grandchildren on the Health of Grandparents

	All (1)	Female (2)	Male (3)	All (4)	Female (5)	Male (6)
	Very Good/ Excellent SAH			**Total Words Recalled**		
1	-0.010	-0.016	-0.004	0.113**	0.149*	0.079
	(0.009)	(0.012)	(0.012)	(0.056)	(0.079)	(0.079)
2	-0.034***	-0.045***	-0.021	0.034	0.034	0.039
	(0.011)	(0.015)	(0.017)	(0.075)	(0.107)	(0.104)
3 or more	-0.039***	-0.052***	-0.025	0.024	0.080	-0.029
	(0.014)	(0.019)	(0.020)	(0.090)	(0.130)	(0.126)
	Quality of Life			**At least 1 (I)ADL Limitation**		
1	-0.209**	-0.165	-0.247**	-0.012**	-0.015*	-0.009
	(0.089)	(0.127)	(0.123)	(0.006)	(0.008)	(0.007)
2	-0.307**	-0.405**	-0.198	-0.008	-0.009	-0.006
	(0.125)	(0.170)	(0.185)	(0.008)	(0.012)	(0.010)
3 or more	-0.443***	-0.568***	-0.310	-0.009	-0.012	-0.005
	(0.143)	(0.208)	(0.199)	(0.009)	(0.014)	(0.012)
	Depressive Symptoms			**Maximum Grip Strength**		
1	-0.002	-0.010	0.007	-0.013	0.017	-0.073
	(0.008)	(0.012)	(0.009)	(0.110)	(0.131)	(0.179)
2	0.003	0.008	-0.003	0.069	0.050	0.085
	(0.010)	(0.016)	(0.013)	(0.154)	(0.181)	(0.247)
3 or more	0.004	0.020	-0.010	0.103	0.038	0.195
	(0.012)	(0.019)	(0.015)	(0.185)	(0.222)	(0.292)
				Deceased in Next Wave		
1				0.002	0.000	0.003
				(0.002)	(0.002)	(0.003)
2				0.002	0.000	0.003
				(0.002)	(0.003)	(0.004)
3 or more				-0.002	-0.005**	-0.000
				(0.003)	(0.002)	(0.004)

*Note: Sample size for columns (1) and (4) ranges between 37 000 and 43 000. The sample size by gender ranges between 18 000 and 22 000. These are the results of fixed effect regressions that also control for age, age squared and wave dummies. Negative coefficients for very good/excellent health, quality of life, total words recalled and maximum grip strength indicate worse outcomes, while negative coefficients for depressive symptoms, at least 1 (I)ADL and deceased indicate more beneficial outcomes. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1*

Table 5: Heterogeneity of the Effect of Becoming a Grandparent on Health by Family Cohesion Measures

	Very Good/ Excellent SAH		**Quality of Life**		**Depressive Symptoms**		**Total Words Recalled**		**At least 1 (I)ADL limitation**		**Maximum Grip Strength**		**Deceased in Next Wave**	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Close contact with oldest child prior to grandparenthood														
Yes	-0.012	-0.016	-0.195	-0.083	-0.025*	-0.013	0.177*	0.070	-0.011	-0.018**	0.071	-0.018	-0.000	-0.003
	(0.014)	(0.016)	(0.160)	(0.171)	(0.015)	(0.012)	(0.094)	(0.093)	(0.010)	(0.009)	(0.164)	(0.234)	(0.002)	(0.003)
No	-0.034*	-0.011	-0.284	-0.340*	-0.007	0.008	0.266**	0.050	-0.021	-0.007	0.113	-0.025	-0.002	0.001
	(0.020)	(0.020)	(0.217)	(0.185)	(0.020)	(0.015)	(0.131)	(0.128)	(0.014)	(0.011)	(0.200)	(0.286)	(0.002)	(0.004)
Close contact with youngest child prior to grandparenthood														
Yes	-0.012	-0.015	-0.104	-0.030	-0.030**	-0.015	0.207**	0.054	-0.025**	-0.009	0.209	0.097	-0.003*	-0.004
	(0.015)	(0.017)	(0.159)	(0.167)	(0.015)	(0.012)	(0.098)	(0.098)	(0.011)	(0.009)	(0.168)	(0.238)	(0.002)	(0.003)
No	-0.039*	-0.030	-0.481*	-0.292	-0.017	0.019	0.270*	-0.102	0.005	-0.011	-0.071	-0.104	0.002	0.002
	(0.023)	(0.022)	(0.259)	(0.224)	(0.022)	(0.017)	(0.144)	(0.143)	(0.016)	(0.012)	(0.225)	(0.335)	(0.004)	(0.005)
Provision of grandchild care														
Daily	-0.047*	0.056*	-0.927***	0.760*	0.016	0.054*	0.040	0.640***	-0.003	-0.052**	0.533	0.607	-0.006*	-0.001
	(0.026)	(0.033)	(0.349)	(0.392)	(0.033)	(0.028)	(0.191)	(0.235)	(0.024)	(0.021)	(0.380)	(0.573)	(0.003)	(0.009)
Yes, but	-0.019	-0.011	-0.202	-0.152	-0.016	-0.009	0.215**	0.107	-0.022**	-0.010	0.095	-0.036	-0.001	-0.009***
not daily	(0.014)	(0.016)	(0.148)	(0.152)	(0.013)	(0.011)	(0.090)	(0.092)	(0.010)	(0.008)	(0.143)	(0.222)	(0.002)	(0.003)
Never	-0.064***	-0.018	-0.642**	-0.604***	0.007	-0.019	0.087	-0.082	-0.002	0.018	-0.291	-0.238	-0.001	0.010*
	(0.020)	(0.019)	(0.260)	(0.221)	(0.022)	(0.016)	(0.149)	(0.128)	(0.016)	(0.012)	(0.244)	(0.292)	(0.003)	(0.005)
Distance to oldest child prior to grandparenthood														
Max. 5 km	-0.021	-0.017	-0.309*	-0.339*	-0.010	-0.003	-0.083	-0.026	-0.015	-0.007	0.040	0.072	-0.000	0.009**
	(0.015)	(0.016)	(0.182)	(0.176)	(0.016)	(0.012)	(0.103)	(0.104)	(0.011)	(0.009)	(0.175)	(0.249)	(0.002)	(0.004)
5-100 km	-0.018	-0.018	-0.138	-0.330**	-0.007	0.005	0.108	0.069	-0.017	-0.012	0.210	-0.271	0.001	0.001
	(0.016)	(0.017)	(0.165)	(0.167)	(0.016)	(0.012)	(0.104)	(0.106)	(0.012)	(0.010)	(0.187)	(0.248)	(0.003)	(0.004)
100 and	-0.051**	0.010	-0.470**	0.004	0.011	0.002	0.455***	0.184	-0.005	-0.009	-0.191	0.294	-0.004	-0.008**
more	(0.020)	(0.020)	(0.214)	(0.208)	(0.019)	(0.015)	(0.139)	(0.129)	(0.013)	(0.011)	(0.208)	(0.291)	(0.002)	(0.003)

*Note: The sample sizes ranges between 15 000 and 20 000. These are the results of fixed effect regressions that also control for age, age squared and wave dummies Negative coefficients for very good/excellent health, quality of life, total words recalled and maximum grip strength indicate worse outcomes, while negative coefficients for depressive symptoms, at least 1 (I)ADL and deceased indicate more beneficial outcomes. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*

Table 6: Potential Channels Through Which Becoming a Grandparent may Affect Health

	Female	Male
	(1)	(2)
	Close contact w. any child	
grandparent	0.033***	0.026**
	(0.011)	(0.012)
N	18,365	17,513
	Moderate physical activity	
grandparent	-0.006	0.003
	(0.008)	(0.008)
N	21,839	21,058
	Vigorous physical activity	
grandparent	-0.036***	-0.024**
	(0.012)	(0.012)
N	21,840	21,058

*Note: These are the results of fixed effect regressions that also control for age, age squared and wave dummies. All dependent variables are indicator variables. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*

Table 7: Heterogeneity by Lineage

	Very Good/ Excellent SAH		**Quality of Life**		**Depressive Symptoms**	
	Female	Male	Female	Male	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Transition through daughter or son						
Daughter	-0.030*	0.016	-0.244	-0.017	-0.031*	0.011
	(0.017)	(0.018)	(0.202)	(0.186)	(0.018)	(0.014)
Son	-0.031*	-0.012	-0.287	-0.435**	-0.000	-0.007
	(0.017)	(0.018)	(0.192)	(0.185)	(0.017)	(0.015)

	Total Words Recalled		**At least 1 (I)ADL limitation**		**Maximum Grip Strength**		**Deceased in Next Wave**	
	Female	Male	Female	Male	Female	Male	Female	Male
	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Transition through daughter or son								
Daughter	0.112	0.078	0.004	-0.013	0.105	-0.259	-0.002	-0.003
	(0.114)	(0.111)	(0.012)	(0.009)	(0.199)	(0.262)	(0.002)	(0.003)
Son	0.053	0.042	-0.023*	0.005	0.029	-0.280	-0.002	-0.001
	(0.109)	(0.111)	(0.013)	(0.011)	(0.176)	(0.264)	(0.002)	(0.004)

*Note: The sample sizes ranges between 17 000 and 19 600. These are the results of fixed effect regressions that also control for age, age squared and wave dummies. Negative coefficients for very good/excellent health, quality of life, total words recalled and maximum grip strength indicate worse outcomes, while negative coefficients for depressive symptoms, at least 1 (I)ADL and deceased indicate more beneficial outcomes. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*

Are grandchildren good for you?

Well-Being and Health Effects of Becoming a Grandparent

Birgit Leimer and Reyn Joris van Ewijk

Appendix

Appendix A

Determining Time Since Becoming a Grandparent

Since the transition into grandparenthood may have delayed effects on health and may change with the age of grandchildren, we want to identify the time an individual has spent as a grandparent.[1] Since we do not have information on the year of birth of all grandchildren, we take advantage of SHARE being asked in regular time intervals (about every two years) to roughly identify the time since the transition to grandparenthood.[2] Independent of how many times we observe an individual, we can identify between which waves an individual became a grandparent.

The first wave of SHARE took place in 2004/2005 with later waves being conducted biennially (Wave 1 in 2006/2007, Wave 2 in 2008/2009, Wave 4 in 2011, Wave 5 in 2013, Wave 6 in 2015). There are five different waves in which an individual can first appear as a grandparent: Wave 2, 3, 4, 5 or 6 (see Panel A of Table A-1). However, due to the structure of Wave 3, we do not have information for presence of grandchildren in Wave 3. Therefore, all individuals who become grandparents between Waves 2 and 4 are first observed as grandparents in Wave 4. Once we identify the first wave as a grandparent, we can assign whether the transition occurred between the current wave (t) and the previous wave ($t-1$), or between the previous wave ($t-1$) and the wave prior to it ($t-2$), etc. (see Panel B in Table A-1).

This identification is straightforward for individuals who first appear as grandparents in Waves 2, 5 and 6. The time since the grandparent transition is less clear for individuals who first appear as grandparents in Wave 4, as it is unknown whether the transition occurred between Waves 2 and 3 or Waves 3 and 4. We therefore can only assign a broader gap of $t-2$ & t in Wave 4, $t-3$ & $t-1$ in Wave 5 and $t-5$ & $t-3$ in Wave 6 (see Panel B in Table A-1). This implies that some observations will have to be excluded from our analyses, as there is no mutually exclusive set of categories capturing all individuals.

[1] Additionally, the effect of taking on a new role in life as a grandparent, and the effect of realizing that one now belongs to the grandparent generation and therefore feels old, may wear off. At the same time, the number of grandchildren one has may increase while the first grandchild gets older. We analyze this effect in subsequent analyses on the intensive margin. We acknowledge that it is not possible to completely separate effects of the time since becoming a grandparent, from the effects of the age of grandchildren and from effects of the number of grandchildren that one has.

[2] The average time between two waves decreases slightly over time, with an average duration of 28 months between interviews in Wave 1 and 2 and 27 months between Waves 4 and 5 as well as 5 and 6. The average time between interviews in Wave 2 and 4 is 53 months.

In our analyses, we use three categories: becoming a grandparent between waves $t-1$ & t, between waves $t-3$ & $t-1$, and between waves $t-5$ & $t-3$, which roughly corresponds to the oldest grandchild being between 0-2, 2-6, and 6-10 years old. Consequently, observations from Waves 4 and 6 of individuals first appearing as grandparents in Wave 4 have to be excluded from this analysis, as they do not fit into these categories. (These observations are however included in all other analyses.)

Table A-1: Identification of Grandparent Status and Timing of the Transition

Panel A: Grandparent (yes/no)

		Wave					
		1	2	*3*	4	5	6
Individual	A	no	yes	*yes*	yes	yes	yes
	B	no	no	*?*	yes	yes	yes
	C	no	no	*no*	no	yes	yes
	D	no	no	*no*	no	no	yes

Panel B: Timing of grandparenthood transition

		Wave					
		1	2	*3*	4	5	6
Individual	A	0	t-1 & t	*t-2 & t-1*	t-3 & t-2	t-4 & t-3	t-5 & t-4
	B	0	0	*?*	t-2 & t	t-3 & t-1	t-4 & t-2
	C	0	0	*0*	0	t-1 & t	t-2 & t-1
	D	0	0	*0*	0	0	t-1 & t

Note: Following four hypothetical individuals that are observed in all waves, this table shows the four possible scenarios for transitioning into grandparenthood, and the corresponding time-in-grandparenthood during the various waves in which these persons are observed. We do not observe grandparent status in Wave 3 and therefore cannot distinguish between individuals who transition into grandparenthood between Waves 2 and 3 or between 3 and 4. We will observe them for the first time as grandparents in Wave 4.

Appendix B – Tables

Appendix Table B-1: Robustness Checks - Age Specification and Age Cut-Off

	Two-stage dif-in-difs		Linear Age Trend		Cubic Age Trend		Individuals Aged 50-65		Individuals Aged 50+	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Very Good/ Excellent SAH									
grandparent	-0.033	-0.004	-0.027**	-0.011	-0.029***	-0.013	-0.026**	-0.005	-0.027***	-0.010
	(0.012)	(0.013)	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)	(0.013)	(0.010)	(0.011)
	Quality of Life									
grandparent	-0.481**	-0.779***	-0.237**	-0.246**	-0.298**	-0.269**	-0.297**	-0.082	-0.280**	-0.221*
	(0.156)	(0.165)	(0.116)	(0.118)	(0.117)	(0.117)	(0.126)	(0.135)	(0.116)	(0.116)
	Depressive Symptoms									
grandparent	0.009	0.001	-0.006	0.002	-0.001	0.003	-0.008	0.005	-0.001	0.000
	(0.012)	(0.010)	(0.011)	(0.009)	(0.011)	(0.009)	(0.012)	(0.010)	(0.011)	(0.009)
	Total Words Recalled									
grandparent	0.129	0.127	0.153**	0.050	0.119	0.058	0.069	0.025	0.114	0.062
	(0.082)	(0.079)	(0.072)	(0.071)	(0.072)	(0.071)	(0.081)	(0.083)	(0.071)	(0.070)
	At least 1 (I)ADL Limitation									
grandparent	-0.015*	-0.008	-0.018**	-0.007	-0.012	-0.006	-0.011	-0.015*	-0.012	-0.011*
	(0.009)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)
	Maximum Grip Strength									
grandparent	0.090	-0.204	0.064	0.000	0.009	-0.003	0.046	-0.107	-0.003	0.045
	(0.136)	(0.198)	(0.121)	(0.167)	(0.122)	(0.168)	(0.136)	(0.201)	(0.121)	(0.166)
	Deceased in Next Wave									
grandparent	-0.003*	-0.005*	-0.002	0.003	-0.000	0.004	0.001	0.003	0.001	0.003
	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.001)	(0.003)	(0.002)	(0.003)

*Note: Sample sizes range between 16 500 and 22 000 for women and 15 000 and 21 500 for men. These are the results of fixed effect regressions that, unless otherwise indicated, also control for age, age squared and wave dummies. Negative coefficients for very good/excellent health, quality of life, total words recalled and maximum grip strength indicate worse outcomes, while negative coefficients for depressive symptoms, at least 1 (I)ADL and deceased indicate more beneficial outcomes. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*

Appendix Table B-2: Robustness Check - The Effect of Becoming a Grandparent on the Probability to be Observed in Next Wave

	Female	Male
	(1)	(2)
Not Observed Next Wave		
grandparent	0.010	0.004
	(0.011)	(0.011)
N	16,152	15,769

Appendix Table B-3: Robustness Check - Excluding One Country at a Time

	Excl. Austria		Excl. Germany		Excl. Sweden		Excl. Netherlands		Excl. Spain		Excl. Italy		Excl. France		Excl. Denmark		Excl. Switzerland		Excl. Belgium	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Very Good/ Excellent SAH																				
GP	-0.022**	-0.006	-0.028**	-0.010	-0.027**	-0.011	-0.029***	-0.012	-0.027**	-0.014	-0.030***	-0.014	-0.028**	-0.011	-0.033***	-0.011	-0.027**	-0.012	-0.024**	-0.007
	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)
Quality of Life																				
GP	-0.296**	-0.254**	-0.290**	-0.283**	-0.257**	-0.252**	-0.216*	-0.151	-0.335***	-0.263**	-0.172	-0.206*	-0.304**	-0.261**	-0.294**	-0.280**	-0.273**	-0.281**	-0.247**	-0.223*
	(0.121)	(0.122)	(0.121)	(0.123)	(0.124)	(0.126)	(0.125)	(0.124)	(0.118)	(0.119)	(0.119)	(0.120)	(0.123)	(0.124)	(0.125)	(0.127)	(0.124)	(0.124)	(0.126)	(0.126)
Depressive Symptoms																				
GP	-0.007	0.001	0.001	0.006	-0.000	-0.000	-0.002	0.001	0.007	0.002	-0.005	-0.001	-0.005	0.004	-0.002	0.002	-0.000	0.005	-0.006	0.003
	(0.011)	(0.009)	(0.011)	(0.009)	(0.011)	(0.009)	(0.011)	(0.009)	(0.011)	(0.009)	(0.011)	(0.009)	(0.011)	(0.009)	(0.011)	(0.009)	(0.011)	(0.009)	(0.011)	(0.009)
Total words recalled																				
GP	0.123	0.075	0.120	0.058	0.066	0.056	0.115	0.055	0.143*	0.057	0.104	0.003	0.089	0.030	0.107	0.058	0.114	0.096	0.151*	0.037
	(0.075)	(0.072)	(0.075)	(0.075)	(0.076)	(0.075)	(0.076)	(0.074)	(0.076)	(0.074)	(0.078)	(0.076)	(0.077)	(0.076)	(0.076)	(0.075)	(0.075)	(0.074)	(0.078)	(0.077)
At least 1 (I)ADL Limitation																				
GP	-0.014*	-0.011	-0.016**	-0.005	-0.014*	-0.007	-0.015*	-0.006	-0.008	-0.007	-0.016*	-0.008	-0.012	-0.008	-0.012	-0.010	-0.015*	-0.008	-0.012	-0.005
	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)
Maximum grip strength																				
GP	0.016	0.011	-0.042	-0.047	0.033	0.078	0.083	-0.074	0.016	-0.086	0.011	-0.049	0.013	0.094	-0.007	0.059	0.040	0.015	0.110	0.033
	(0.125)	(0.171)	(0.126)	(0.174)	(0.129)	(0.179)	(0.128)	(0.174)	(0.122)	(0.172)	(0.127)	(0.174)	(0.131)	(0.182)	(0.130)	(0.179)	(0.128)	(0.177)	(0.134)	(0.181)
Deceased in next wave																				
GP	-0.000	0.003	-0.000	0.003	-0.001	0.003	-0.002	0.003	0.000	0.002	-0.000	0.001	0.000	0.003	-0.001	0.004	-0.001	0.003	-0.002	0.003
	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)

*Note: GP stands for grandparent. The sample sizes ranges between 17 000 and 20 000 for men and women. These are the results of fixed effect regressions that also control for age, age squared and wave dummies. Negative coefficients for very good/excellent health, quality of life, total words recalled and maximum grip strength indicate worse outcomes, while negative coefficients for depressive symptoms, at least 1 (I)ADL and deceased indicate more beneficial outcomes. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*

Appendix Table B-4: Robustness Check - The Effect of a Health Decline on the Probability of Becoming a Grandparent

Grandparent	Female (1)	Male (2)		Female (3)	Male (4)
health decline – **Self-Assessed Health**	-0.018	0.022	health decline – **Words Recalled**	-0.000	0.011
	(0.015)	(0.017)		(0.011)	(0.011)
N	3,258	3,015	N	3,218	2,946
health decline – **Quality of Life**	-0.016	-0.012	health decline – **(I)ADL Limitations**	0.012	0.033
	(0.011)	(0.011)		(0.023)	(0.027)
N	3,106	2,871	N	3,260	3,015
health decline – **Depressive Symptoms**	-0.019	-0.001	health decline – **Grip Strength**	-0.007	-0.003
	(0.015)	(0.020)		(0.011)	(0.011)
N	3,206	2,953	N	3,024	2,839

*Note: These are the results of pooled OLS regression that measure the effect of a health decline of the respective health outcome on the probability to becoming a grandparent. All regressions also control for age, age squared, gender, years of education, country of residence, being in a relationship, number of children and composition of children (number of sons and daughters). Only data from Wave 5 is used for individuals who were observed in Waves 4, 5 and 6. Negative coefficients indicate a lower likelihood of becoming a grandparent when experiencing a health/well-being decline prior to grandparenthood. Robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*

Appendix Table B-5: Robustness Check - The Effect of Becoming a Grandparent on Health Excluding Individuals with Health Shocks

	Excluding Individuals Reporting Heart Attack, Cancer or Stroke			
	Prior to Having Grandchildren		**Prior to / First Wave of Having Grandchildren**	
	Female	Male	Female	Male
	(1)	(2)	(3)	(4)
Very Good/ Excellent SAH				
grandparent	-0.035***	-0.022*	-0.031***	-0.016
	(0.012)	(0.013)	(0.012)	(0.013)
Quality of Life				
grandparent	-0.321***	-0.339***	-0.306**	-0.299**
	(0.123)	(0.125)	(0.124)	(0.128)
Depressive Symptoms				
grandparent	0.006	0.016*	0.001	0.008
	(0.011)	(0.009)	(0.011)	(0.009)
Total Words Recalled				
grandparent	0.074	0.001	0.100	0.023
	(0.078)	(0.077)	(0.079)	(0.079)
At least 1 (I)ADL Limitation				
grandparent	-0.007	0.004	-0.008	-0.004
	(0.008)	(0.006)	(0.008)	(0.006)
Maximum Grip Strength				
grandparent	0.011	-0.028	0.060	-0.054
	(0.130)	(0.180)	(0.132)	(0.181)
Deceased in Next Wave				
grandparent	0.000	0.004	0.000	0.002
	(0.002)	(0.002)	(0.002)	(0.002)

*Note: The sample sizes ranges between 18 000 and 22 000 for men and women. These are the results of fixed effect regressions that also control for age, age squared and wave dummies. Negative coefficients for very good/excellent health, quality of life, total words recalled and maximum grip strength indicate worse outcomes, while negative coefficients for depressive symptoms, at least 1 (I)ADL and deceased indicate more beneficial outcomes. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*

Appendix Table B-6: Robustness Check - The Effect of Becoming a Grandparent in the Next Wave on Health (Placebo Test)

	Female	Male	Female	Male
	(1)	(2)	(3)	(4)
	Very Good/ Excellent SAH		**Total Words Recalled**	
grandparent in next wave	0.021	-0.030	-0.018	0.131
	(0.018)	(0.019)	(0.125)	(0.127)
	Quality of Life		**At Least 1 (I)ADL Limitation**	
grandparent in next wave	0.172	-0.199	-0.015	0.006
	(0.193)	(0.203)	(0.013)	(0.012)
	Depressive Symptoms		**Maximum Grip Strength**	
grandparent in next wave	-0.006	-0.011	0.232	0.098
	(0.019)	(0.016)	(0.196)	(0.294)

*Note: The sample sizes ranges between 16 100 and 17 300 for women and 15 800 and 17 000 for men. Individuals who first appear as grandparents in Wave 4 are excluded in this analysis, due to the data restrictions. The effect is identified through individuals first appearing as grandparents in Waves 2, 5 or 6. These are the results of fixed effect regressions that also control for age, age squared and wave dummies. Negative coefficients for very good/excellent health, quality of life, total words recalled and maximum grip strength indicate worse outcomes, while negative coefficients for depressive symptoms, at least 1 (I)ADL and deceased indicate more beneficial outcomes. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*

Appendix Table B-7: Robustness Check - The Effect of Becoming a Grandparent on Health Accounting for Time-Varying Variables

	Controlling for having at least one married child		**Controlling for Retirement**		**Excl. Individuals who simultaneously retire and become grandparents**	
	Female	Male	Female	Male	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Very Good/ Excellent SAH						
grandparent	-0.027**	-0.013	-0.027**	-0.012	-0.029***	-0.017
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)
Quality of Life						
grandparent	-0.291**	-0.293**	-0.281**	-0.269**	-0.304**	-0.325***
	(0.120)	(0.120)	(0.116)	(0.117)	(0.122)	(0.123)
Depressive Symptoms						
grandparent	-0.002	0.001	-0.003	0.004	0.000	0.009
	(0.011)	(0.009)	(0.011)	(0.009)	(0.011)	(0.009)
Total Words Recalled						
grandparent	0.094	0.062	0.116	0.046	0.140*	0.027
	(0.073)	(0.073)	(0.072)	(0.071)	(0.076)	(0.075)
At least 1 (I)ADL Limitation						
grandparent	-0.012	-0.008	-0.013	-0.006	-0.011	-0.009
	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)
Maximum Grip Strength						
grandparent	0.047	0.008	0.029	0.003	-0.007	0.043
	(0.127)	(0.172)	(0.122)	(0.167)	(0.128)	(0.176)
Deceased in Next Wave						
grandparent	-0.001	0.003	-0.001	0.003	-0.001	0.003
	(0.002)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)

*Note: The sample sizes ranges between 18 000 and 22 000 for men and women. These are the results of fixed effect regressions that also control for age, age squared and wave dummies. Negative coefficients for very good/excellent health, quality of life, total words recalled and maximum grip strength indicate worse outcomes, while negative coefficients for depressive symptoms, at least 1 (I)ADL and deceased indicate more beneficial outcomes. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*

Appendix Table B-8: Robustness Check - Retiring and the Probability of Becoming a Grandparent

	Female (1)	Male (2)
Grandparent Transition Between t-1 & t		
Retired between t-2 & t-1	-0.037	0.061**
	(0.028)	(0.030)
Retired between t-1 & t	0.053***	0.031**
	(0.017)	(0.013)
N	10,452	11,715

*Note: These are the results of fixed effect regressions that also control for age, age squared and wave dummies. Identification only through individuals who first appear as grandparents in Wave 6, since the retirement variables cannot be both defined for any other case. Individuals who transitioned in waves 2, 4 or 5 are excluded from this analysis. This analysis only uses data from Waves 4, 5 and 6. Homemakers are excluded. Cluster-robust standard errors reported in parentheses. Significance levels: ***p<0.01, **p<0.05, *p<0.1.*